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No. XX. OF VOL. I., 1942.
No. 6194. VOL. CCXLII.

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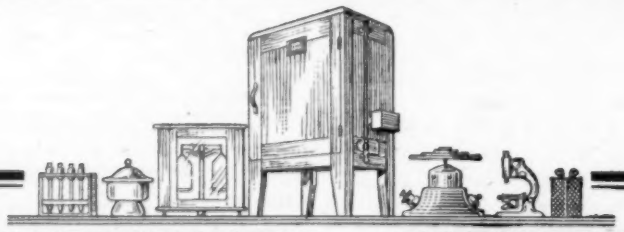

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1. "*Treatment of Burns by Envelope Irrigation*," *British Medical Journal, July 12th*, 1941, *p.* 47.
2. "*Experiences in an E.M.S. Base Hospital in the London Area*," *Edinburgh Medical Journal, January*, 1942, *pp.* 25–26.

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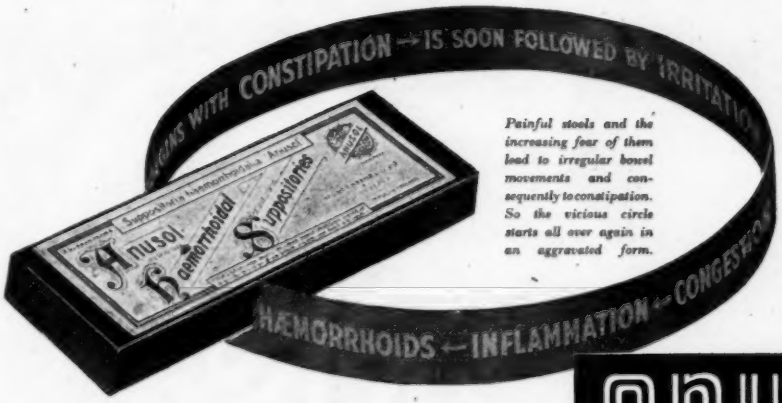
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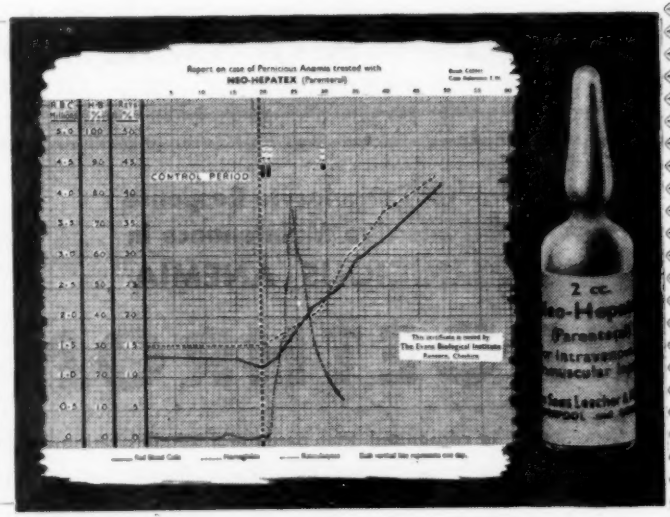

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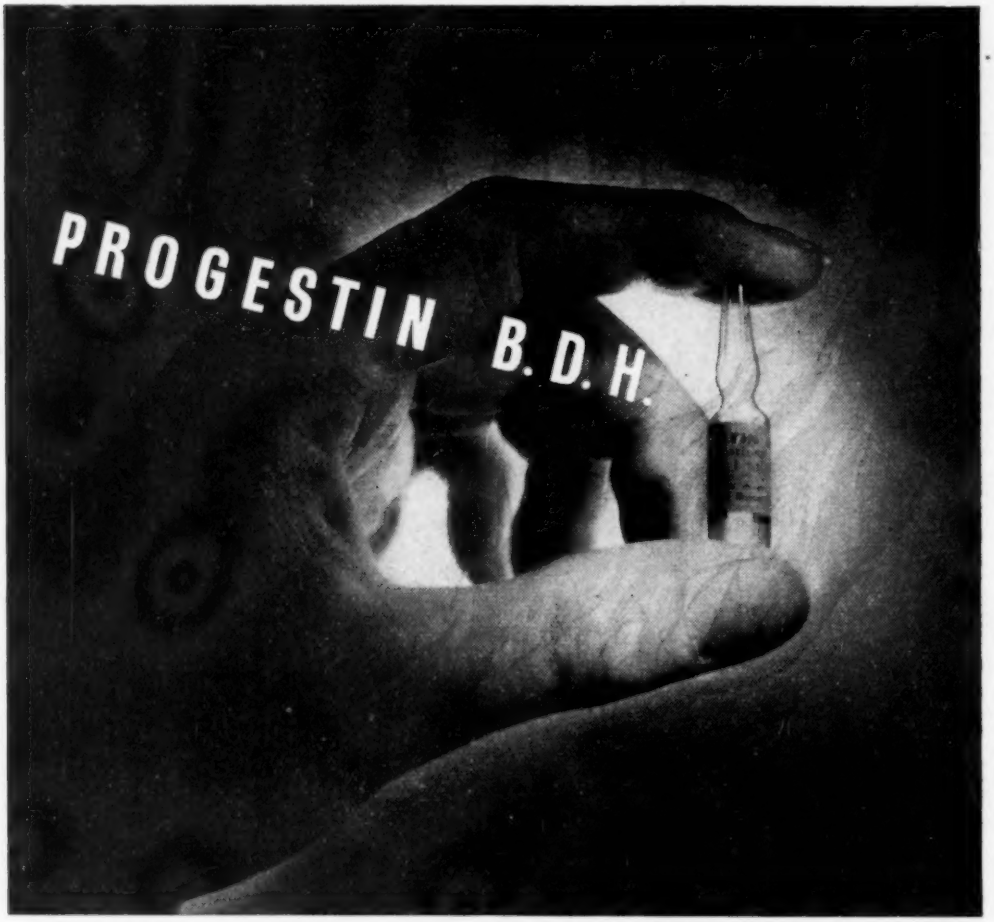

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THE HAZARDS OF TRANSFUSION*

L. E. H. WHITBY, C.V.O., M.C., M.D. CAMB., F.R.C.P., BRIGADIER A.M.S.

ASSISTANT PATHOLOGIST TO THE MIDDLESEX HOSPITAL; CONSULTING PHYSICIAN IN BLOOD-TRANSFUSION AND RESUSCITATION TO THE ARMY

IN theory, blood-transfusion should be a perfect tissue graft—a physiological procedure which, provided safeguards are taken, should be unaccompanied by reaction, distress, discomfort or complication of any kind. Yet, in practice, reactions are common; some maintain that nearly all transfusions of fresh blood are associated with a rise of temperature even though this may be symptomless [16 32]; others believe that about 50% of fresh blood-transfusions are associated with a rise of temperature or a rigor, the incidence of the latter being about 8%.[23] In attempting to review the hazards, I cannot help first casting my mind back over twenty years to student days when blood-transfusion was practised with whole fresh blood obtained in Kimpton's paraffin-lined tube. The success of this type of transfusion was remarkable; the volume rarely exceeded a pint, the rate was that at which the blood would flow in, and when cleanly administered by an expert the apparent reaction rate was negligible. Nowadays we have come to rely on citrated blood which presents no technical difficulties, which can be stored for long periods, which has widened the scope of transfusion as a therapeutic measure and can be administered in large amounts at varying rates, but which has brought with its advantages a number of additional hazards. The physician must sometimes regret the passing of the older and more difficult technique for selected cases, despite its disadvantage of vein dissection, when his patient requires to have added to the circulation something more than mere volume or mere red corpuscles. Whole blood is the nearest approach to a perfect tissue graft.

The hazards which have to be faced with blood-transfusion are: (1) the systemic non-specific pyrexial type of reaction due mainly to the apparatus and crystalloid fluids used in transfusion work; (2) circulatory and vascular disasters due to the general condition of the recipient; (3) intravascular hæmolysis of the transfused blood; and (4) disease transmitted from the donor.

Systemic Reactions

Reliable statistics concerning reactions of this type are difficult to obtain mainly because there is no uniformity of opinion as to what constitutes a reaction, which itself varies with the person who carries out the transfusion, with the method employed, with the rate of administration and the condition of the patient. Too fast a rate can cause a rigor which ceases instantly if the rate be slowed.[37] This should be borne in mind when treating casualties many of whom should theoretically receive a large amount rapidly.

Febrile reactions have been placed in three grades[32]: those associated with a rise of temperature to 100° F. but no other objective features, those with a similar or greater rise of temperature associated with a feeling of cold but no actual rigor, and those associated with a definite rigor. The adoption of this classification would do much to enable a proper assessment to be made of the incidence and severity of non-specific reactions following the use of the various transfusion fluids. Most authorities [3 6 13] are agreed that with stored blood cleanly taken and of reasonable age—that is, not exceeding 14 days—the non-specific reaction-rate is no greater than with fresh citrated blood. Simple pyrexial reactions are most commonly due to foreign protein, dead bacteria, disintegrated or intact, and living but non-pathogenic bacteria; all of these may be found in improperly prepared or stale distilled water, improperly prepared solutions and dirty apparatus. The body will not tolerate the introduction into the circulation of more than a limited amount of foreign protein, and it is estimated [18] that solutions with an albuminoid ammonia content of 0·005–0·025 part per 1000 always give rise to pyrexial reactions. "Saline fever" was tracked down to distilled water when the first intravenous arsenicals were being used,[23] and to this day stale distilled water is one of the chief causes of febrile reactions; good fresh tap water has less bacteria than old distilled water. The prime requirements are scrupulous cleanliness of apparatus, fresh distilled water from a still fitted with proper baffle plates to prevent carrying over of foreign material, and the immediate autoclaving of all solutions in their final containers.[41] Neglect of this last precaution is a frequent cause of pyrexial reactions because the at first insignificant aerial contamination of the contents has time to multiply with the passing of time. How much can be done to reduce these non-specific reactions can be seen [22] from two comparable series of some hundreds of transfusions in which the incidence was reduced from 12% to 1·2% merely by following a scrupulous cleansing technique and using fresh distilled water.

Most of these hazards are therefore avoidable and a high incidence of reactions of this type reflects greatly on the efficiency of those whose job it is to prepare apparatus and solutions. Such reactions, rarely fatal, may occasionally be the last straw in an enfeebled patient, and must often diminish the benefit of the transfusion. Most of those with experience of blood depots would now admit that their contamination-rate is fairly high; the degree of contamination is small and the pathogenicity of most of the organisms is negligible. If the blood is administered fresh no reaction follows, nor does it if the blood is immediately cooled and the few bacteria are promptly subjected to the restraining action of the refrigerator. But if such blood is not promptly cooled or if it is removed from the refrigerator and allowed to warm up for any length of time a pyrexial reaction is to be expected. Common sense is necessary in the handling of stored blood in order to avoid these avoidable hazards. It should be appreciated that the more violent of the non-specific reactions may clinically resemble the serious reactions caused by over-age blood and incompatible blood; a helpful differentiating feature is the intense lumbar pain which is so characteristic of true intravascular hæmolysis.

Circulatory

When relatively large amounts of fluid are introduced into the circulation its fate depends on its nature. Thus, crystalloid solutions rapidly reach the tissues and may cause pulmonary œdema; they leave the circulation even though blood-volume is reduced. The proper use for crystalloid solutions is to overcome tissue dehydration and not for the fleeting restoration of blood-volume. But water bound to protein, as in blood, plasma or serum, is retained in the circulation if blood-volume is reduced; nor if it is excreted does it appear to traverse the same path as crystalloid-bound water. Transfusions under war conditions are often massive, involving 5, 6 or 7 pints of blood or blood substitute.[14] What is the danger then of overloading a circulation? Analysis of transfusion fatalities in peace-time shows that 4 out of 6 died of pulmonary œdema in one series,[31] and 2 out of 7 in another.[7] But all these deaths occurred in anæmic patients with an enfeebled cardiac muscle, and at a time when the importance of volume and rate of administration had not been fully appreciated. In time of war the usual casualty may be presumed to have had a normal cardiac muscle before being wounded and from an experience of some 150 transfusions in casualties I have yet to see a case of pulmonary œdema from necessary massive transfusion[1]; some indeed have developed remote inflammatory lung complications but no-one could say with conviction that the anæsthetic had played no part in producing these. This opinion is confirmed by recent experimental work [34] on 13 normal human subjects—that is, subjects with a normal blood-volume. These have received from 700 to 2100 c.cm. of serum intravenously in 7–20 minutes, one as much as 2 litres in 16 minutes, with no more than a trifling embarrassment and certainly no pulmonary œdema. I am sure that in casualty work failure to restore blood-volume is a danger greater than overloading of the circulation.

But with an enfeebled cardiac muscle the problem is entirely different. For such cases excellent principles have been laid down [35] as to volume and rate, on the basis of a large experience. It has been concluded that the rate should never exceed 1 c.cm. per lb. of body-weight per hour in the average case, while in those whose

* Harveian lecture delivered to the Harveian Society of London on May 4, 1942.

initial hæmoglobin is below 25%, with cachexia, with cardiac disorders or respiratory embarrassment the rate should be reduced to 0·5 c.cm.; in these too, restoration of hæmoglobin to a normal level should be achieved by transfusion at intervals rather than at one session. These rates should not be exceeded even for short periods. If these principles are adhered to the circulation has time to adapt itself to the increased blood-volume and to extrude the unwanted plasma. The danger of overloading in the course of a massive transfusion to these chancy subjects with feeble cardiac muscle has been greatly reduced by the use of concentrated red-cell suspension transfusions which call for no effort to eliminate the unwanted plasma.[24 44] Vascular accidents such as retinal hæmorrhage are not uncommon with nephritis or with the blood dyscrasias.[7]

Intravascular Hæmolysis

Compatibility provides a fascinating study. The hazard to be faced, with gross incompatibility, is agglutination and lysis of the cells leading sometimes to immediate death or more often to death in the course of a few days, but a fatal issue is by no means inevitable even when large amounts are transfused. The symptoms of such a disaster include violent pain in the back, rigor, respiratory embarrassment, circulatory collapse, hæmoglobinuria, hæmalbuminæmia, jaundice, urticaria and symptoms due to small hæmorrhages or emboli in the brain, mesentery, endocardium and gastro-intestinal mucosa; the terminal stages of those who survive the immediate so-called "hæmolytic shock" are characterised by renal failure. A number of studies[38, 46] have been made on surviving cases which throw light on the mechanism of much rarer but nevertheless similar reactions due to factors additional to the Landsteiner groups, and especially on the extra risks which are run by pregnant women and by those who have to receive multiple transfusions.

LANDSTEINER GROUPS

The transfusion of incompatible corpuscles introduces into the circulation an antigenic foreign protein. The result is the classical antigen-antibody reaction. The contributed agglutinogen first absorbs the circulating agglutinin so that in the early phases the offending agglutinin may not be detectable in samples of the recipient's serum.[39] Thus, A corpuscles given to an O recipient may temporarily remove all the α agglutinin which the latter should possess. This is a trap which should be borne in mind by those called on to investigate such a disaster. But the remote effect, should the recipient survive the first insult, is stimulation of the agglutinin to a very high level. There must be quite a number with weak agglutinins who have survived an incompatible transfusion with mild, unnoticed or disregarded symptoms. But woe betide them if they be later transfused from the same, apparently compatible, donor.

Landsteiner group compatibility—the A, B, O factors—depends for safety entirely on properly performed grouping tests, the correct procedure for which has been fully described.[36] The menace of a blood-grouping test wrongly performed can be appreciated from an analysis of 7 transfusion fatalities of which 2 were due to group A wrongly determined as O[7]; 4 out of 6 in another series were also due to wrong grouping.[6] In these days of mass grouping and large blood banks of group O blood, errors not only technical but also clerical have to be carefully guarded against. No-one nowadays would send out blood guaranteed to be a certain group without a careful recheck of both cells and serum. The greatest danger is the use of impotent serum or of serum not sufficiently potent to detect with ease the insensitive A_2 factor in the subgroups A_2, and especially A_2B, so that these groups are mislabelled O and B respectively with disastrous results when used as donors. Infected serum, which has panagglutinating properties or infected corpuscle suspensions, may lead to the wrong determination of group AB and if these be considered universal recipients tragedy may follow; "cold agglutination," if not recognised, may lead to the same result. Provided the Landsteiner group has been determined correctly the hazard of incompatibility is negligible in the case of a first transfusion except late in pregnancy and in the puerperium.

UNIVERSAL DONORS

In theory it is always better to make a homologous transfusion because both corpuscles and plasma are compatible. And there has long been an impression that it is not only economically wrong to make routine use of universal donors but also that these donors are by no means always safe or ideal. There can be no doubt that most disasters with group O donors have been due to misgrouping; at a first transfusion these donors contribute also two rare additional risks described below—high titre α and β agglutinins in their plasma, and the presence in the recipient of the very rare anti-O (α_2) agglutinin; otherwise, except in pregnant and puerperal women, they are as safe as a homologous donor. But, as with all repeated transfusions, the group O donor may immunise the recipient because certain group O corpuscles are antigenic[12]; the O factor is a positive one and does not merely indicate absence of A and B. Instances of this type of disaster have been reported[21 30] after repeated transfusions of group O blood but in view of more recent discoveries it seems probable that these accidents were due to factors other than O, the so-called "intragroup" incompatibility. At this point I would emphasise the enormous importance of the direct grouping test properly performed supplemented by the simple biological test, the slow injection of the first 20 c.cm. of the transfusion, whenever multiple transfusions are necessary even though—perhaps especially if—the same donor is used. Once compatible always compatible is fallacious.

SUBGROUPS A_1 AND A_2

Groups A and AB are each subdivided into two by reason of what are known as A_1 and A_2 factors. The most marked difference between A_1 and A_2 is the quantitative one already emphasised, that the A_2 factor is relatively insensitive to agglutination and especially so when in combination with the B factor in subgroup A_2B.[35] A_1 is some four times as common as A_2 and A_1B 1¼ times as common as A_2B. In the vast majority of cases there is no specific differentiation of A_1 and A_2 by corresponding agglutinins α_1 and α_2, the formula of the blood in these groups being $A_1\beta$ $A_2\beta$, A_1Bo and A_2Bo. But very rarely there may be the definite qualitative difference as shown by the finding of α_1 and α_2. Some idea of the rarity of this may be gauged from the records[44] of 819 individual tests in which none in either group A_1B or A_1 contained an α_2 agglutinin and about 0·5% contained α_1 agglutinin mostly in the rarest of all groups, A_2B. Although it is the rarest, α_2 is of course the greatest menace, because it is not only anti-A_2 but also anti-O[9]; for this reason it is regarded as a very irregular and abnormal agglutinin.

In practice the transfusion of A_1 to A_2 and vice versa is usually without action; the transfused cells survive normally. But very rarely the body recognises the distinction between the subgroups and regards the heterologous subgroup as foreign to its economy; these are the occasional cases when α_1 and α_2 are well developed. Here again, a first transfusion usually passes without undue alarm, perhaps without incident. If the agglutinin is weak the hæmolysis is gradual, the so-called "inapparent" type, and is often only suggested by the fact that the transfused cells do not survive and therefore fail to maintain a raised hæmoglobin for any length of time. But the seed has been sown, the antigen implanted, and it is the second and later transfusions which may be associated with smart reactions, especially if the same donor is used. The commonest isoimmunisation is of group A_2 against A_1[44] but this is probably because the α_1 agglutinin occurs more frequently in the natural state; isoimmunisation is at least more efficient if not entirely restricted to those cases who have an initial natural agglutinin. Nevertheless immunisation of A_1 to A_2 has been reported[18] not only as the result of A_2 corpuscles but also from an O transfusion,[46] which is only to be expected in that the α_2 agglutinin is also anti-O. This indeed may be part, but only part, of the real explanation for developed incompatibility to a group O donor.

Isoimmunisation may be effected not only by direct transfusion but also by the antigenic stimulus of a heterologous fœtus in utero. The isoimmunisation of an A_2 mother by an A_1 fœtus has been reported.[44] This adds one more hazard to what is usually called a physiological

process—pregnancy—should the mother during pregnancy, parturition or puerperium stand in need of blood-transfusion.

FACTORS M, N AND P

As to intragroup incompatibility involving the inherited factors M, N, and P, there have been reported only 3 cases of isoimmunisation to factor M, one to factor P and none at all to N.[43] [47] No naturally occurring agglutinins to these factors have been recorded though thousands of examinations have been made. The hazard from such sources is negligible.

RHESUS FACTOR

Great prominence has recently been given in the medical press to what is known as the rhesus or Rh factor [19] which is apparently present in 85% of human bloods; the remaining 15% (Rh −) do not possess this factor nor have they normally any natural isoantibodies in the plasma.[45] But in certain circumstances, as the result of a transfusion or transfusions, or again from a fœtus in utero, a rhesus-negative individual may develop the corresponding agglutinin [45]; this apparently occurs gradually, the agglutinin being at first weak, next active only in the cold and lastly active at 37° C. [39] Those who have made most study of the factor consider it is far more often responsible for the hæmolytic reactions which follow the transfusion of homologous Landsteiner blood than any of the other abnormal or irregular agglutinins such as those found in the subgroups of A.[45] The detection of Rh factor requires a special technique [45] and a special serum but it is clear that for repeated transfusions and for pregnant and puerperal cases it is advisable to use Rh − donors. When the factor itself cannot be specifically determined or excluded, protection should be sought with a carefully performed direct grouping test (using small tubes at a low temperature) as well as the biological test.

The discovery of this factor has suggested an explanation of those hæmolytic tragedies of birth, erythroblastosis fœtalis and allied conditions.[20] The mother, immunised by the Rh + fœtus, passes back through the placenta the destructive antibody which wreaks havoc on the fœtal blood. This attractive theory has much to commend it as it offers an explanation of the origin of the hæmolytic process in utero as well as its familial nature; it is supported by finding that no less than 101 mothers out of 111 were Rh − [20]. The importance of the rhesus factor has been proved by the reports that rhesus-positive transfusions have caused reactions whereas a subsequent rhesus-negative transfusion was uneventful.[33]

I have dealt at some length with these rare subgroup and more common intragroup incompatibilities because it is most necessary to view them in their right perspective. The rhesus factor is the probable explanation of some of the hazards that have previously been attributed to the group O donor. Thousands of successful transfusions have been performed in the past in ignorance or to the neglect of the existence of subgroups and intragroup factors. The important point to appreciate is that, except during pregnancy and the puerperium, the risk is almost non-existent at a first transfusion. But with pregnancy, in the puerperium and with all repeated transfusions the risk must be eliminated.

HIGH TITRE AGGLUTININS

I have dealt so far with factors which concern the compatibility of the donor's corpuscles with the recipient's plasma. But there is always the possibility, particularly with universal donors, of the transfused plasma being of a titre sufficiently high to destroy the corpuscles of the recipient. The protection against this is the rarity with which really high titre agglutinins are found, the diluting action of the recipient's plasma which is usually several times the volume of the transfusion itself, and the natural absorptive antigenic factor found in all cells of the body [48]; A and B factors are not confined to red corpuscles. In actual practice this danger has rarely been found, even under war conditions where massive transfusions of heterologous group O blood have been given to those so exsanguinated that the dilution safeguard hardly comes into operation. Advances have been made towards its elimination altogether by the preparation of pure A and B factors which may be added to group O blood to absorb agglutinins before transfusion; this work is still in the experimental stage.[49] Plasma and serum transfusions carry a definite risk of such a reaction unless precautions have been taken to remove agglutinins by cross absorption or to render them impotent by bulk pooling. It is perhaps worth noting that plasma and serum have both a small content of agglutinogen as well as agglutinin [28]; this helps in cross absorption when pooling is practised.

COLD AGGLUTININS

Normal isoagglutinins are more active at a low temperature than at body temperature. Likewise the irregular or abnormal agglutinins that are concerned with incompatibility are sometimes only feebly active at body temperature [17] [38]; their presence may be readily detected at low temperature but their action in vivo is so slow that their destructive action is inapparent and associated with no clinical symptoms. More striking still is the apparent biological paradox, the so-called autoagglutinin, better called cold agglutinin, which is active only at temperatures of 30° C. or lower and which is found in certain hæmolytic diseases such as paroxysmal hæmoglobinuria as well as other conditions. This phenomenon is more of a nuisance than a menace and can be classed as a hazard only when it has intruded to obscure a proper grouping test or when it has passed unrecognised and the operator administers blood which has not been properly warmed. Cold blood given to a patient with well-developed cold agglutinins will induce a hæmolytic crisis comparable to the disaster of a grossly incompatible transfusion. I have been consulted a number of times and told that the patient by indirect test appears to be a group AB—a universal recipient—whereas paradoxically, by direct test mercifully performed, he appears to be a universal incompatible even with universal-donor blood. The answer to this riddle has always been autoagglutination. The advice given has been to perform the indirect grouping test at 37° C. (and so determine the correct group) and likewise with the direct test, whilst the transfusion itself is to be given with warm blood and a warm patient. One other practical difficulty arises and that is that the cool conditions so favourable to the detection of intragroup and other abnormal incompatibilities favour the intrusion of natural or pathological cold agglutinins which might otherwise pass unnoticed. In a laboratory it is relatively easy to carry out a direct grouping test which eliminates intragroup and subgroup hazards and excludes as well the fallacy of cold agglutination.[47]

STORED BLOOD

There have been many reviews [3] [6] [13] of the nature and number of reactions which follow the transfusion of stored blood, and in general it is concluded that these are no more frequent than with fresh blood provided the storage period has not exceeded 3 weeks. Under pressure of circumstances blood up to 7 weeks old has been given without accident [26] but 14 days or less should be regarded as providing a blood more likely to achieve the therapeutic result desired. Degenerate stored blood suffers the same fate as incompatible blood—it is rapidly hæmolysed or a least that part of it which is degenerated—and death from such a cause has been reported.[6] There is now a very grave danger that the convenience of the blood bank may sometimes, if not frequently, lead to the neglect of the therapeutic ideal.[13] It is so much easier to get a bottle of blood from a refrigerator than to obtain blood fresh from a donor that it may be forgotten that stored blood contains no leucocytes after a few hours, that the content of prothrombin and other clotting elements, complement and antibodies, gradually declines, and that the survival of the transfused corpuscles, if the blood is more than 14 days old, is inversely proportional to the age. Stored blood is excellent for blood-volume restoration in case of hæmorrhage but cannot compare with fresh blood when the maximum survival of red cells is desired or when it is wished to contribute the largest amount of the more ephemeral elements.

TREATMENT OF INTRAVASCULAR HÆMOLYSIS

The fortunately rare accident of incompatibility does not lend itself to statistical study for the assessment of the correct treatment. The accepted method, based on experimental work,[2] is alkalinisation of the urine in order to keep pigment debris in solution and prevent death from renal blockage. Apart from alkalinisation, which

requires the administration by mouth or intravenously of approximately 35 g. potassium citrate every 24 hours, it is essential to ensure an adequate output of urine with a generous fluid intake.[5] Many do not now accept the renal blockage theory as the cause of the renal failure, which they ascribe to damage caused to the kidney by arterial spasm and ischæmia.[11] On clinical grounds this view is supported by the striking and constant early symptom of lumbar pain before pigment deposition can have come into the picture. This symptom has always impressed me as the most important early indication of a definitely incompatible transfusion. The spasm is said to be due to the release of depressor substances from the broken down erythrocytes which cause arterial spasm, dilatation of the capillary bed and a sharp fall in blood-pressure. Alkalinisation tends to relieve the spasm, but a treatment said to be more effective,[11] and one which is rarely considered is the prompt (at least within 24 hours) transfusion of 200–300 c.cm. of compatible blood. This is said to relieve the condition at once, while a mere syringeful, 20 c.cm., is said to relieve pain.

Transmissible Disease

The last hazard is that of transmissible disease. Syphilis comes first to mind but the incidence of the disease is so low in most parts of this country that the risk is not great; in a series of several thousand unselected donors in the West Country the incidence of a positive serological test has been less than 0·5%[1]; up to the time of the war some 40 cases had been reported[4] in Europe and America. The usual safeguard is a serological test on the donor, which should obviously be performed at the time of taking the blood rather than in advance. The limitations of this safeguard should be appreciated; the late primary or early secondary stages of syphilis, times when the serological test is often negative or at least doubtful, are the most infectious periods, whereas a chronic tertiary with a strongly positive serological test is probably quite innocuous. Storage of blood affords considerable protection in that virulent spirochætes appear unable to survive in this medium for more than 4 days. Filtration of plasma and serum removes the chance of transmission so that serological tests are unnecessary when such processing is carried out.

Stored blood, and unfiltered plasma or serum, carry the risk of bacterial contamination sufficient to induce at least a pyrexial reaction and at most, fortunately rarely, a virulent and fatal septicæmia. Experience has shown that the contamination-rate of blood is fairly high, and if there are also the manipulations necessary to separate plasma or serum the incidence is increased. Refrigeration at 4–6° C. is some protection in that it inhibits rapid growth, but many bacteria survive and even multiply at this temperature and certainly if the refrigerated blood be allowed to warm up. Care of a blood bank is a great responsibility; frequent inspection is necessary as well as experience in the detection of early suspicious signs of contamination, while all should be warned that once blood has been removed from a refrigerator it must be used without delay; it must never be allowed to warm up and then be restored to the refrigerator for another occasion. Unfiltered plasma is a dangerous fluid; its natural turbidity obscures any turbidity due to bacterial contamination—the simplest macroscopic test of fitness for use. There has been little or no report of transference of virus infections though one case of encephalitis transmitted from a donor incubating varicella has been recorded. Infective hepatitis, which before the war caused a tragic series of deaths from the use of unfiltered measles serum, has mercifully not been met with.

Malaria is a hazard difficult to avoid especially in malarial endemic centres. Filtration of plasma or serum offers a complete protection but for whole blood the danger is considered to be so great that, ideally, no-one should be used as a donor who has ever even resided in a malarial area and certainly no-one who has ever had an attack.[37] When these ideals are impossible some protection is afforded by cinchonisation of the potential donor or of the recipient for some days beforehand.[39] No great study has yet been made of the survival of the parasite under conditions of blood storage. Transmission of malaria has been fairly frequently recorded from donors apparently malaria free but in no more tragic circumstances than that of the newborn infant which received a small intramuscular injection of parental blood and developed a fatal malignant infection.[29] Ironically enough it may often be that the donor suffers more than the recipient; the removal of a pint of blood apparently stimulates the marrow, a common latent focus, so that the donor may suffer a malarial attack after years of freedom.

Allergy to proteins may be communicated by transfusion[10] especially with repeated transfusions from the same donor,[40] and in normal times it is as well to avoid donors with an allergic history. Under war conditions, when much blood is pooled for plasma or serum preparation, the chance of this is very rare. Urticarial reactions follow about 1% of transfusions.[44]

Conclusions

The majority of hazards are avoidable. The simple pyrexial reaction with or without rigor can be almost eliminated by scrupulous cleanliness and technique. Experience and good clinical judgment reduce the incidence of circulatory disasters. Intravascular hæmolysis from incompatibility will always crop up from time to time if a haphazard technique is used for the indirect or direct grouping tests. If the Landsteiner groups have been correctly determined the risk of incompatibility from other factors is negligible at a first transfusion. But with multiple transfusions and with single or multiple transfusions to women during pregnancy or the puerperium especial care is necessary; for these an elaborate direct grouping test as well as the simple biological test should never be omitted. The old clinical impression that it is dangerous to employ the same donor for repeated transfusions to the same recipient now seems to be explained by the frequency of rhesus-positive individuals who are potentially dangerous donors for multiple transfusions to a rhesus-negative recipient. If circumstances permit, homologous transfusion is the ideal and is greatly to be preferred to the routine use of universal donors, though under war conditions this ideal may not be possible. Even with all modern advances there still remain a small number of reactions which arise particularly in patients with chronic medical illnesses though every care has been taken in grouping; these remind us that we are still ignorant of many subtle differences in the composition of human red corpuscles. A noted authority[47] has estimated that human corpuscles can be differentiated into 72 blood groups by means of already known factors; very few of these groups are concerned with transfusion work though they often help to explain a disaster. Nevertheless these numerous facts indicate the complexity of the subject and suggest that the individuality of the blood may one day be sufficiently well studied to enable a man to be identified or excluded by it in the same way as he may be with finger prints.

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DIFFUSION OF SULPHANILAMIDE, ACRIFLAVINE AND GENTIAN VIOLET

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THE work of Hawking[1] on the diffusion of various sulphonamides through agar gels has shown that the distance travelled by saturated solutions of these compounds through tubes of agar gel depends on their solubilities. He also suggested that the distance travelled by the solutions varies with the square root of the time. The following are typical distances travelled during the first 24 hours by saturated solutions of sulphonamides placed in contact with the gel at 35° C. in a test-tube 1 cm. in diameter.

Sulphanilamide 4·2 cm. Sulphapyridine 2·6 cm.
Sulphaguanidine 3·1 cm. Sulphadiazine 2 cm.
Sulphathiazole 2·7 cm.

Hawking used the agar gels as laboratory models of body tissues and fluids.

In this paper diffusion experiments are described in which agar gels and dead tissue were used. The compounds tested were sulphanilamide (the sulphonamide most widely used for implantation into wounds), acriflavine and gentian violet. The two latter are in common use as wound antiseptics, gentian violet being of particular use in the treatment of burns.

AGAR GELS

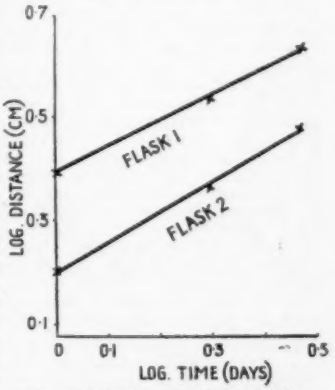
In the first series of experiments glass test-tubes, 1·1 cm. in diameter, were filled with 4% agar made with bicarbonate-free Locke's solution (sodium chloride 9 g., potassium chloride 0·2 g., calcium chloride 0·2 g. in 1 litre of water). For the sulphanilamide diffusion tests, 1·25 ml. of Ehrlich's reagent (*p*-dimethylaminobenzaldehyde 1·57 g., hydrochloric acid 20 ml., water 100 ml.) was added to each 100 ml. of agar get just before it was poured into the tubes. When in contact with sulphonamides this reagent produces a yellow colour in the gel which can readily be seen and measured. In the cases of acriflavine and gentian violet the distance the solutions have diffused can be judged by the spread of colour in the agar. In all these experiments the agar tubes were suspended in an inverted position in a conical flask containing 1 litre of the appropriate solution, the open end with the agar trimmed flat hanging just below the surface of the liquid. After the stated times the distance between the interface and the point at which the colour was just visible was measured with a millimetre scale (table I).

TABLE I—EXPERIMENTS WITH AGAR GELS AT 15° C.

Flask	Concentration	Solubility at 16° C. (%)	Distance (cm.) diffused after 24 hr.	48 hr.	72 hr.
1	Sulphanilamide 0·1%	0·42	2·5	3·4	4·3
2	Sulphanilamide 1/2000 g.-mol. per l.	0·42	1·6	2·3	3
3	Acriflavine 0·1%	33·3	0·6	0·8	..
4	Acriflavine 1/2000 g.-mol. per l.	33·3	0·4	0·7	0·9
5	Gentian violet 0·1%	4	0·65	0·9	..
6	Gentian violet 1/2000 g.-mol. per l.	4	0·6	0·9	1·2

Strengths of solutions containing 1/2000 g.-mol per litre are: sulphanilamide, 0·086 g. per l.; acriflavine, 0·148 g. per l.; gentian violet, 0·203 g. per l. The use of these solutions enables solutions of strengths based on molecular weights to be compared.

In the case of sulphanilamide my results, taken in conjunction with those of Hawking[2] (see table below), suggest that the rate of diffusion decreases with the decrease in concentration of the solution. My figures are of the same order as those of Hawking, but as he has shown the actual diffusion is slow through dead tissue, and the concentration therein is less than my figures suggest.



Rate of diffusion of sulphanilamide—through agar. Flask 1, sulphanilamide 0·1%. Flask 2, sulphanilamide 1/2000 g.-mol. per litre.

In order to analyse the results obtained with the two solutions of sulphanilamide still further the logarithm of the distance travelled by the solutions up the agar tube was plotted against the logarithm of the time; the points, for both solutions, fall almost on a straight line (see figure). This confirms the results obtained by Hawking using a saturated solution of sulphanilamide at 16° C. and in all three cases the lines correspond to the equation:

$$\log x = b \log t + \log k$$

where x is the distance in cm. travelled from the interface, t is the time in days, b is a constant representing the slope of the line, and k is a constant equal to the distance in cm. travelled by the solution on the first day. The figures for b and k obtained in the present experiments, with those obtained by Hawking (marked with asterisk) were as follows.

Conc. of sulphanilamide	*Days*	*b*	*k*
Saturated sol. (0·42%) ..	1 ..	0·468* ..	2·93*
0·1% ..	2 ..	0·447 ..	2·5
1/2000 g.-mol. per l. ..	2 ..	0·537 ..	1·6

The figures for b under these different conditions are, within experimental error, closely similar and as Hawking has pointed out 0·5 may possibly be the true figure in each case. If so, the distance travelled by the solution up the agar tubes would vary directly with the square-root of the time.

ACRIFLAVINE AND GENTIAN VIOLET

If the diffusion figures for gentian violet and acriflavine are plotted as in the figure the points do not fall so neatly on a straight line as they do with sulphanilamide. Because of this, and because, though the solubilities of acriflavine and gentian violet are greater than that of sulphanilamide the rates of diffusion are considerably less, it is clear that another factor must be taken into account in these two cases. This factor inhibits diffusion, as shown below.

After 48 hours the deeply coloured portion of the agar from flask 3 (0·1% solution) and flask 5 (0·1% solution) was cut off with a razor, washed quickly to remove surplus solution and cut into small pieces in distilled water. After 24 hours immersion it was found that in both instances only a very dilute solution of acriflavine or gentian violet had been produced and the pieces of agar gel remained deeply coloured throughout. Moreover, the gel was almost unswollen after its immersion in the water, though normal agar swells under such conditions.

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Evidently the acriflavine and gentian violet have become fixed on the agar, the action probably being similar to that of some dyes when they come into contact with bacteria and certain body cells. The fixation of these compounds by the agar accounts for the comparatively slow rate of diffusion as compared with that of sulphanilamide, and suggests that in the treatment of wounds containing dead tissue the diffusion of acriflavine and gentian violet through such tissue would be very slow after fixation had occurred. In view of these results with laboratory models of body tissues and fluids, experiments with actual dead tissue were carried out.

Dead-tissue experiments.—Thin strips of dead mouse subcutaneous and cutaneous tissue (1–1·5 mm. thick) were suspended in a 0·1% solution of acriflavine and similar strips in a 0·1% solution of gentian violet. After 5 hours the strips were removed from each solution and washed to remove any surplus liquid. In both cases the tissue was found to be deeply impregnated with the solution, the deeper subcutaneous layers being more heavily coloured than the immediate cutaneous layers. The tissue was then cut into smaller strips and allowed to stand in water for 36 hours, after which the water was found to be lightly coloured in both instances, the tissue remaining deeply impregnated with the acriflavine or gentian violet. These results are identical with those obtained with the agar gel and it is evident that dead body tissues can fix both acriflavine and gentian violet.

TABLE II—RESULTS WITH STAB CULTURES IN TREATED NUTRIENT AGAR

Tube	Organisms	Results	
		At 24 hr.	Between 48 and 72 hr.
1a	Mixed culture from throat swab	Little growth	Growth over whole length of stab.
1b			Some growth below end of diffusion line only.
1c			Distinct growth below end of diffusion line only.
2a	Mixed anaerobic from milk*	Little growth	Heavy growth almost whole length of stab.
2b			As 1b; agar split by gas.
2c			As 1c; agar split by gas.

* Including *Clostridium welchii*.

1a and 2a = control tubes; 1b and 2b = tubes treated with gentian violet; 1c and 2c = tubes treated with acriflavine.

Bacteriological tests.—It was important to know whether this fixation resulted in the loss of bactericidal power of these antiseptics and experiments were therefore carried out to decide this. In the first series agar plates were prepared each containing the same quantity of sterile nutrient agar made with 5% agar gel. This strength was used in order to limit to some extent the depth of diffusion, which would have been much greater if the usual 2% gel had been employed. Equal numbers of plates were used as controls, and for the acriflavine and gentian violet experiments. Groups of plates were prepared as follows:

Group A: 5 c.cm. sterile water added to control plates.
„ B: 5 c.cm. 1 in a 1000 solution of acriflavine added to each plate.
„ C: 5 c.cm. 1 in a 1000 solution of gentian violet added to each.

After standing for 90 min. the liquid was poured from the surface of the agar of all the plates, and they were all—including the control plates—washed under running water for 30 min. in order to remove all traces of free acriflavine and gentian violet. The surface of each plate was then dried with sterile filter paper. In groups B and C diffusion was found to have taken place through about ¼ of the depth of the gel. At the end of the experiments it was proved that no free dye remained in the gel by cutting up the gels of groups B and C and allowing them to stand in distilled water; very little colour appeared in the water after many hours. Each plate in groups A, B and C was then inoculated heavily with a culture prepared from a throat swab and incubated at 37°. After 24 hours distinct growth was obvious on the plates in group A but there was no growth on plates in groups B and C. After 7 days' incubation there was still no growth on plates in the two latter groups but the growth on group A plates had distinctly increased.

A further series of experiments was performed using test-tubes ½ full of sterile nutrient agar (5%) and treated in the same manner as the plates in groups A, B and C. In this case the distance of diffusion in the acriflavine and gentian violet tubes was about ¼ of the depth of the agar. Two inoculations were made by the stab method into each group (table II).

From these results it appears that when acriflavine and gentian violet are fixed by agar gels, and hence very probably by dead body tissue, the antiseptic properties are not abolished. These tests would not, of course, detect an impairment of 50–75%.

DISCUSSION

From the diffusion experiments it is clear that the presence of much dead tissue in a wound will prevent gentian violet and acriflavine from reaching healthy tissue to the most desirable extent since the fixation by dead tissue greatly inhibits diffusion of these substances. The results of the bacteriological experiments, however, suggest that in wounds containing dead tissue acriflavine or gentian violet will not become so fixed by dead tissue, that they are prevented from acting as antiseptics, and that they impregnate dead tissue sufficiently deeply to prevent them from serving as foci of infection. Thus while thorough removal of the dead tissue from wounds is desirable it seems that if wounds are treated with acriflavine or gentian violet any unremoved dead tissue will not act as a nidus for the development of bacteria.

SUMMARY

The rate of diffusion of sulphanilamide through laboratory models of body tissue is greater than that of either acriflavine or gentian violet and its rate of diffusion decreases with decrease in concentration of the solution.

Fixation of acriflavine and gentian violet by dead body tissues greatly restricts the diffusion of these substances. This fixation is permanent. The fixation, however, does not result in loss of antiseptic power and bacteria are unable to grow on laboratory models of dead tissue (nutrient agar) on which acriflavine or gentian violet has become fixed. Growth is rapid on similar agar models which are untreated.

The work described in this paper was carried out in the laboratories of Endocrines-Spicer Ltd. and Sulfarsenol Laboratories Ltd., to both of whom thanks are due.

ALCOHOLIC BERIBERI HEART

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ALCOHOLIC beriberi heart is uncommon in Great Britain. Two cases are described here in Europeans who had lived in the tropics for over two years, and lived in messes where the diet was adequate. No other form of vitamin-B_1 deficiency was discovered in their messes or other units.

Aalsmeer and Wenckebach[1] divide cardiovascular beriberi as seen in Java into three groups: (1) a mild ambulatory type with dyspnœa and palpitation; (2) a moderately severe type with cardiac enlargement and polyneuritis; and (3) an acute pernicious form, seen in desperately ill patients with vomiting, dyspnœa and restlessness, epigastric pain, enlarged heart, dependent œdema, engorged veins, tachycardia and a low diastolic pressure. Morgan Jones and Crighton Bramwell,[2] who reported a case and reviewed the literature, say that the diagnosis rests essentially on the dissimilarity of the clinical syndrome from that of heart-failure due to other causes; the absence of the more common ætiological factors responsible for producing heart-failure; the presence of dietary abnormality compatible with a gross deficiency of vitamin B_1; and the response to treatment with vitamin B_1. The condition occurs in chronic alcoholism due to deficient food intake following anorexia and the replacement of other carbohydrates by alcohol which is deficient in vitamin B_1, while high carbohydrate diets require an increased amount of vitamin B_1.

CASE-RECORDS

CASE 1.—A warrant officer, aged 33, was admitted to hospital on May 19, 1941, complaining of anorexia for the

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2. Jones, A. M. and Bramwell, C. *Brit. Heart J.* 1939, **1**, 187.

previous 10 days, lassitude, swelling of ankles, dyspnœa on exertion and leg pains. He had had 17 years' service; 2 years overseas on present tour, one in Iraq and one in Aden. There was no history of rheumatic fever, tonsillitis, chorea, diphtheria, scarlet fever or growing pains and he had completed a full course of treatment for syphilis 5 years previously. He was employed on administrative duties, lived in the station sergeants' mess and ran the station dance band. He drank 3–6 pints of beer daily, and more at the week-end when his band played at the officers' club; he had been drinking heavily the previous Christmas.

Slightly built and looked pale, tired and ill. Pulse-rate 90 per min., regular. Tongue slightly furred. Fauces and lungs normal. Well-marked pulsation in carotids, and apex-beat very diffuse in 5th and 6th left interspace 4 in. from mid-line. Dullness on percussion half an inch from right border of sternum. Heart sounds forcible and second sound re-duplicated at apex and base. Systolic bruits heard over carotids. Blood-pressure 122/48 mm. Hg. Liver smooth; palpable 1 in. below left costal margin. Spleen not palpable. Œdema over both ankles. Weakness of both legs with muscle tenderness and hypoæsthesia over both tibiæ. Knee- and ankle-jerks absent; plantars flexor and other reflexes sluggish. Urine: slight trace of albumin but no casts. Blood picture: slight secondary anæmia. Kahn reaction negative. Fluid intake (24 hours) 52 oz.; output 12 oz.

On May 12 he was ordered 5 mg. of vitamin B_1 ('Benerva') twice daily intramuscularly; this was increased to thrice daily on the 13th and altered to 1 mg. t.d.s. on the 14th. This dosage was continued till the 19th, when 43 mg. had been given in all. 'Betaxan' tablets, 2 t.d.s., were then substituted. 'Bemax' and 'Marmite' were given throughout. Fluid intake remained about 50 oz., but urinary output rose to 104 oz. on May 14. By May 16 œdema had disappeared, heart and liver had shrunk and there was general improvement. Blood-pressure 120/78 mm. Hg. By June muscle tenderness had almost disappeared though other CNS signs were unchanged. Lumbar puncture gave a fluid normal in pressure and chemistry and with a negative Kahn reaction. On June 29 he was up all day, but on July 3 he developed acute otitis externa from which he had recovered on July 10.

He was fit for discharge on July 18 to light duty and fit for full duties three weeks later. On discharge slight tenderness of legs on deep pressure persisted; ankle reflexes could just be obtained and knee-jerks on reinforcement.

CASE 2.—A battery quartermaster sergeant, aged 33, was admitted to hospital on July 8, 1941, complaining of dyspnœa, cough and anorexia for 3–5 weeks. Swelling of ankles had appeared 4 days before admission. No previous medical history of importance. He had never suffered from rheumatic fever, sore throats, scarlet fever, chorea, diphtheria or bronchitis. He had served for 2½ years in Aden, mainly on office duties. He said his alcohol intake was 3–4 pints of beer daily, though messmates suggested that it was much higher. He lived in his unit sergeants' mess.

He was stoutly built, cyanosed and his neck veins were congested. Pulse-rate 108 per min., regular. Apex-beat in 5th left interspace 4 in. from midline. Dullness 1 in. to right of sternum. Aortic sounds faint; systolic and diastolic murmurs in 3rd left interspace and systolic murmur at apex. Blood-pressure 124/48 mm. Hg. Liver smooth, tender and palpable 2 in. below costal margin. Lungs: fine crepitations at both bases. Œdema over both ankles. Urine: sp. gr. 1016; normal. No evidence of disease in CNS. Given tincture of digitalis min. 80 four-hourly. On July 9 he had min. 120 and on the 10th min. 100, when it was discontinued; total min. 320. Pulse-rate remained regular at 100–118 and condition was unchanged. Dyspnœa and distress were well-marked and morphia gave little relief. Fluid intake remained about 50 oz. and urinary output 20–40 oz. On evening of July 10 venesection (one pint) followed by morphia gr. ¼ gave relief but œdema and congestion persisted next day. 'Salyrgan' 1 c.cm. was given intravenously on July 11 and 2 c.cm. on the 13th with no effect. On the 14th pulse-rate 118 and signs unchanged. Vomited twice in the morning and complained of cardiac pain. At midday tinct. digitalis min. 40 four-hourly was recommenced and 10 mg. vitamin B_1 (benerva) given intramuscularly. On the 15th pulse-rate 78, œdema had almost disappeared, urinary output 86 oz., and patient had much improved. On the 16th digitalis was omitted (min. 360 had been given) and daily injections of 10 mg. vitamin B_1 continued.

On July 20, when intramuscular vitamin B_1 was discontinued and bemax and marmite substituted, there was no evidence of cardiovascular disease. As his foreign tour was almost completed he was transferred on that date to a hospital ship for England.

DISCUSSION

The first case, showing cardiac enlargement and peripheral neuritis, fits into Aalsmeer and Wenckebach's group 2. I was unwilling to diagnose the second case on admission as an alcoholic beriberi but the failure to respond to rest, digitalis and salyrgan, followed by the rapid response to vitamin B_1 combined with digitalis, confirmed the diagnosis and the case belongs to group 3. Heavy doses of intramuscular vitamin B_1 were given to these patients but the response would probably have been as satisfactory with smaller dosage. The men came from widely separated units, and the diets in all units were investigated and showed no lack of vitamin B_1. No other cases suggestive of even minor deficiencies could be found. Hospital records show no evidence of previous similar cases. Jones and Bramwell suggest that minor degrees of deficiency may be common and unrecognised and may contribute to the development of cardiac failure in patients with rheumatic fever, or syphilitic or hypertensive heart disease.

I am indebted to Wing Commander H. Penman, officer commanding the RAF Hospital, Aden, for permission to publish these notes.

EFFICIENCY OF THE ROSE AND SELLORS MASK

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WE have tested the efficiency of a slightly modified form of the improvised oxygen mask described by Rose and Sellors.[1] The modified form is made from X-ray film cut in the shape shown in fig. 1; AB and AB′ are sewn together with about 1 in. overlap; the perforated rubber tube is attached along this junction for about 4 in.; XBB′ Y is reinforced with copper wire and bound with lint, and the tapes are attached at X, Y, c and d. When the mask is applied to the patient, the wire-reinforced edge has to be moulded to give close contact with the skin under the chin and up to the level of the ears, and the mask should be adjusted to leave a space of about 2½ in. between its upper part and the patient's forehead.

Alveolar air concentrations of oxygen and carbon dioxide were determined in 6 subjects after breathing oxygen supplied at varying rates of flow through this mask. In each case the subject lay on his back, with his head on a pillow, and the mask was held in position by an assistant. Oxygen at any given rate was breathed for 5 min. Then, on a word of command, the subject held his breath (at the end of an expiration or of an inspiration), the mask was quickly removed and the mouthpiece of a straight 1 in. diameter tube, 4 ft. long, was placed in the subject's mouth. As soon as the mouthpiece was in position the subject expired fully into the tube with closed nostrils, and a sample of air was taken from its proximal end into an evacuated sampling tube. The samples were analysed on a large Haldane apparatus. After a little initial training all the subjects gave reasonably consistent results. These are set out in the table and the alveolar oxygen concentrations are plotted against the rate of flow of oxygen in fig. 2. From these it will be seen that alveolar oxygen concentrations between 40% and 60% are readily obtained with rates of flow between 4 and 6 litres. This is a higher concentration than is usually attained with oxygen administration

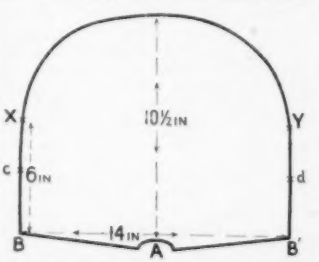

FIG. 1—Dimensions of mask cut from X-ray film.

1. Rose, A. and Sellors, T. H. *Lancet*, 1940, i, 648.

through nasal catheters.[2] The figures also show that the alveolar oxygen concentration attained at a given rate of oxygen flow tends to vary inversely as the subject's vital capacity (and presumably as his pulmonary ventilation). This indicates the need for higher rates of oxygen flow in larger patients, a principle which no doubt also applies to the administration of oxygen through nasal catheters.

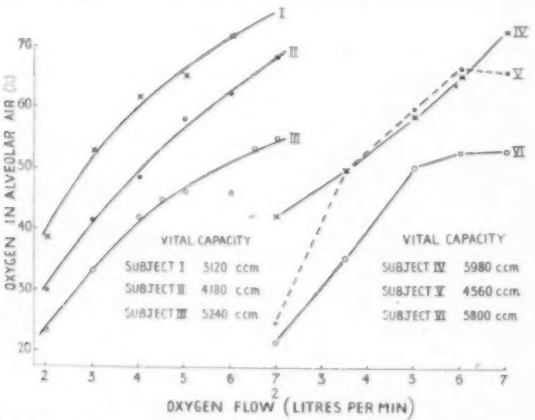

FIG. 2—Alveolar concentrations of oxygen obtained with different rates of flow.

The CO_2 figures indicate in some cases a slight degree of rebreathing, which is probably an advantage.

We have used this mask for over a year in a medical ward. It is the most comfortable and least disturbing apparatus that we know for the administration of oxygen, not excepting the BLB mask. Its one disadvantage is that it has to be temporarily removed to allow of expectoration, vomiting or feeding. Its efficiency seems to be greater than that of most other forms of apparatus, but obviously less than that of the BLB. It may be used for the administration of 5% or 7% CO_2 in oxygen to patients suffering from carbon-monoxide poisoning. It is being recommended by the Department of Health for Scotland for use in hospitals and mobile oxygen units as a supplement to the supply of BLB masks available for treatment of gas casualties.

PERCENTAGES OF CARBON DIOXIDE AND OXYGEN IN ALVEOLAR AIR AFTER ADMINISTRATION OF OXYGEN FOR 5 MIN. THROUGH ROSE AND SELLORS IMPROVISED MASK AT VARYING RATES OF FLOW

Subject	Vital capacity c.cm.	Rate of flow of oxygen (l. per min.)								
		2	3	3·5	4	4·5	5	6	6·5	7
1	3120	6·3	5·9*	..	6·2*	..	5·9*	5·8*	..	5·8
		38·5	*52·9**	..	*61·8**	..	*65·3**	*72·1**	..	*76·6*
2	4180	5·9	5·9*	..	6·1*	..	6·1*	5·8*	..	5·8
		29·9	*41·4**	..	*48·8**	..	*58·3**	*62·5**	..	*68·4*
3	5240	5·9	6	..	6·2*	6·4*	6*	6·3*	6*	5·9*
		23·5	*33·2*	..	*42·1**	*44·9**	*46·3**	*46·2**	*53·4**	*55·2**
4	3980	6·7	..	6·3	..	..	6·3	6·3	..	6
		42·2	..	*50·1*	..	..	*59*	*65·4*	..	*73·1*
5	4560	7·2	..	7·1	..	..	7	7·3	..	6·3
		24·7	..	*49·9*	..	..	*60·1*	*66·9*	..	*66·2*
6	5800	7·1	..	6·9	..	..	7	7	..	5·1
		21·6	..	*38*	..	..	*50·3*	*53·1*	..	*53·3*

Values marked * are means of two samples, one taken at the end of inspiration, the other at the end of expiration; values not so marked are from samples taken at the end of expiration; CO_2 values are given in Roman type and O_2 in italics.

2. Christie, R. V. *Ibid*, 1938, II, 876.

ROYAL MEDICAL BENEVOLENT FUND.—The annual meeting will be held at 4 P.M. on Thursday, May 21, at 10, Wimpole Street, London, W.1. The fund has received £280 as a residual legacy from the estate of Dr. J. J. Thomarson of Bournemouth.

IRON EXCHANGES OF ADULTS ON WHITE AND BROWN BREAD DIETS

E. M. WIDDOWSON, B.SC., PH.D. LOND. — R. A. MCCANCE, M.D. CAMB., F.R.C.P.

(*Department of Medicine, Cambridge*)

IN an experimental study of rationing carried out during the first six months of this war, we (1940) obtained some evidence that calcium was badly absorbed from a diet containing much brown bread. We then set out to explore the effects of flours of high extraction on the mineral metabolism of man. A full account of the way in which the experiments were arranged and the data on calcium, magnesium and phosphorus are being published elsewhere (McCance and Widdowson 1942).

Before setting out the results of the iron studies, there are certain aspects of the metabolism of this element which must be made clear. Cereals contain appreciable amounts of iron—white flour about 1·4 mg. per 100 g. and flour of 92% extraction about 3·5 mg. per 100 g.—and, on the basis of work which will be discussed later, this iron is generally regarded as being freely available for absorption. Brown bread in fact is often advised as a valuable source of iron and white bread contrasted unfavourably with it in this respect.

In 1937 (a, b) we put forward a new conception of the way in which the amount of iron in the body was regulated. Our theory, which has formed a valuable working hypothesis, and has been confirmed by ourselves (Widdowson and McCance 1937, McCance and Widdowson 1938) and accepted by others (Hahn et al. 1939, Maddock and Heath 1939) postulated that the iron taken up from the gut depends mainly on the amount of iron in the plasma or in the body and the amount of iron in the diet. Absorption is promoted by a decrease in the former or an increase in the latter, or both. We further postulated that the quantities of iron excreted into the gut are much less than have usually been supposed. They may in fact be negligible, and should be regarded (like the urinary iron) as playing a very minor part in the total iron metabolism of the body. It follows from this that negative iron balances should never be obtained except at extraordinarily low intakes. Leverton's (1941) results support this view.

Barer and Fowler (1936), in a study of 100 normal women, showed that most lost between 10 and 25 mg. of iron a month with their menstrual discharges, and these figures are of the same order as those which have been found by others (Ohlson and Daum 1935, Farrar and Goldhamer 1935, Leverton and Roberts 1937, Leverton 1941), and which will be discussed later. Apart, therefore, from any theoretical consideration, common sense tells us that healthy women should absorb daily something like 0·5 mg.—i.e., the iron in their food should exceed the iron in their fæces by this amount. Men should not absorb so much as this, or not at any rate for more than short periods, and hence their daily absorptions over a long span of time ought to be of a much lower order. Yet there is no consistent evidence from the small number of metabolism experiments which have so far been carried out that women do tend to absorb as much as 0·5 mg. of iron per day, or for that matter that they absorb any more than men (Ohlson and Daum 1935, Farrar and Goldhamer 1935, Widdowson and McCance 1937, McCance and Widdowson 1938). Only the few women studied by Leverton and Roberts (1937) and by Leverton (1941) can be regarded as showing absorptions in conformity with their physiological requirements, and unfortunately they were not compared with men under the same conditions. The iron intakes during all these studies have ranged from 3·1 to 13·6 mg. per day, so that the higher ones should have provided the subjects with enough iron for their needs, and Leverton's (1941) women did absorb the metal freely when they were given 7·8 mg. per day.

SUBJECTS AND METHODS

Four men and four women have taken part in these experiments. They were described by McCance and Widdowson (1942). The analytical periods were 7 days in length, and 3 or 4 consecutive weeks on each type of diet were employed, preceded by a preliminary period of

3 or 4 days. In all, there were ten 7-day periods on diets in which 40–50% of the calories were derived from white flour, but which were normal in other respects, and thirteen 7-day periods on diets otherwise similar, but in which wheat-meal flour of 92% extraction replaced the white. Some of the subjects did not take part in all the experiments.

Foods, urines and fæces were sampled and ashed as described by McCance and Widdowson (1942), whose paper should be consulted for all further technical details. The iron in the ashed samples of the foods and fæces was estimated by the thioglycollic acid method (McCance, Widdowson and Shackleton 1936). The thiocyanate method (McCance and Shipp, 1933) was used for urines.

Losses of iron in menstruation were determined as follows. The used sanitary towels were burned, with the aid of a little alcohol, in a silica dish. The charred remains were then moistened with water, transferred to a silica crucible and ashed at 450° C. Subsequent treatment of the ash was the same as that employed for foods and fæces. Unused sanitary towels, treated in exactly the same way, served as controls.

RESULTS

Menstrual Losses.—In two of the subjects taking part in the metabolism experiment the menstrual losses were determined for successive periods throughout a whole year. Subject A menstruated on 12 occasions during this time; subject B, 13 times; subject C was only able to coöperate in this part of the investigation on 8 occasions and subject D not at all. In table I are given the iron losess of subjects A, B and C during successive menstrual periods. Several points are brought out by a study of these figures. First, one individual's losses differed very much from those of another. Barer and Fowler (1936), in their study of 100 women, found an enormous range of variation, from 2 mg. to 110 mg. a month. In the present investigation, subject B regularly lost about eight times as much blood as A. C's losses were intermediate. An "average" menstrual loss, therefore, may be little or no guide to the loss of an individual. Each woman must be considered separately so far as her iron requirements and iron metabolism are concerned. Thus, subject A would only have to absorb 0·1 mg. of iron a day to make good her menstrual loss, and no metabolism experiment could be carried out with this degree of accuracy. Subject B, on the other hand, should absorb about 1 mg. of iron a day, the detection of which should be well within the possibilities of a metabolism experiment.

TABLE I—MENSTRUAL IRON LOSSES OF THREE WOMEN IN SUCCESSIVE PERIODS

Subject	Iron losses in mg. per period	Average (mg.)	Absorption required (mg. per day)
A	2·5, 4·4, 3·5, 3·4, 5·7, 4·9, 2·6, 2·3, 1·8, 2·2, 3·8, 2·0 (Total for 1 year, 39·1)	3·6	0·11
B	24·8, 21·5, 31·8, 23·8, 27·3, 30·9, 21·6, 34, 31, 22·6, 34·4, 25·3, 36 (Total for 1 year, 365)	28	1·0
C	8·8, 9·6, 10·4, 13·1, 10·2, 10·8, 11·8, 14·0 (Total for 8 months, 88·2)	11	0·36

Each individual's loss was remarkably constant from one period to another. This does not seem to have been appreciated by previous workers, although their findings show it quite clearly (Barer and Fowler 1936, Leverton and Roberts 1937, Leverton 1941). Barer and Fowler, who studied 13 women on two, three or four occasions, seem more impressed by the variations in the losses of one or two of these women than by the constancy of the others. The stable behaviour of a single individual over long periods, and the equally constant differences between the responses of individuals to the same external conditions should be more widely recognised. The differences in the facility with which two individua/s may absorb calcium and magnesium may be quoted as another example (McCance and Widdowson 1942).

Our data suggest that menstrual losses in this country are of the same order as those on the other side of the Atlantic. The losses of all three women studied here fell within Barer and Fowler's range, as did also the menstrual losses of a fourth woman, who did not take part in this metabolism experiment. These were analysed on three successive occasions, and amounted to 9·1, 11·6 and 8·8 mg. of iron respectively.

TABLE II—IRON BALANCES ON WHITE AND BROWN BREAD DIET

	Subject	Type of bread	No. of days	Intake mg./day	Excretion mg./day	Balance mg./day	Absorption as % of intake
WOMEN	A	White	63	16·7	14·4	+ 2·3	13·8
	B	,,	70	14·4	12·5	+ 1·9	13·2
	C	,,	49	14·7	12·8	+ 1·9	12·9
	D	,,	42	11·7	10·7	+ 1·0	8·6
	Mean	,,	..	14·4	12·6	+ 1·8	12·5
	A	Brown	84	23·4	22·6	+ 0·8	3·4
	B	,,	63	19·7	20·1	− 0·4	− 2·0
	C	,,	91	23·6	22·6	+ 1·0	4·2
	D	,,	42	17·8	18·1	− 0·3	− 1·7
	Mean	,,	..	21·1	20·9	+ 0·2	1·0
MEN	E	White	63	18·5	17·8	+ 0·7	3·8
	F	,,	63	16·3	14·9	+ 1·4	8·6
	G	,,	49	21·5	21·0	+ 0·5	2·3
	H	,,	56	20·0	17·2	+ 2·8	14·0
	Mean	,,	..	19·1	17·7	+ 1·4	7·3
	E	Brown	84	30·8	30·3	+ 0·5	1·6
	F	,,	77	23·5	22·9	+ 0·6	2·5
	G	,,	70	30·5	30·5	± 0	0
	H	,,	42	26·9	26·7	+ 0·2	0·7
	Mean	,,	..	27·9	27·6	+ 0·3	1·1

Metabolic Studies.—Table II shows the average daily iron intakes and excretions of four men and four women on white and brown bread diets, together with the length of time each person was studied. Representative samples of each person's urine were analysed and found to contain only 0·03–0·06 mg. iron per day on either type of diet, so these results are not given separately but are included in the excretion figures. The white flour used in these experiments contained 1·41 mg. iron per 100 g.; the brown flour 3·55 mg. Hence the iron intakes on the brown bread diets were considerably higher than they were on the white, but even the intakes on the white bread diets were fairly high.

It will be seen that on the brown bread diets both men and women were, within the limits of experimental error, in iron equilibrium. Two of the women were in slight positive iron balance, but subject B, who should have been absorbing 1 mg. a day (vide supra) did not appear to be retaining any. She was in positive balance during 4 of the weeks, and in negative balance during the remaining 5 of this part of the study. On the white bread diets all eight of the subjects were in positive iron balance. The women absorbed more iron than three of the men, but on the white bread diet subject H consistently absorbed more iron than any of the other individuals. Hence, too much significance should not be attached to differences between the averaged results for the two sexes, although they become more obvious when the absorption is expressed as a percentage of the intake.

Effect of Calcium on Iron Absorption.—There seems to be some difference of opinion as to whether calcium has any effect on iron assimilation, and if so whether it promotes or inhibits it. Thus Sherman (1907), Orten and others (1936) and Day and Stein (1938) considered that additional calcium tended to promote iron utilisation. Kletzien (1940), on the other hand, found that the addition of calcium salts to the diet of anæmic rats interfered with their ability to absorb iron. The results shown in table II were obtained by averaging the results of metabolic periods, in some of which the bread contained added calcium salts. The actual amount of calcium added (0·01% of the total dry food) was very small when compared with the amounts that Kletzien added to his rats' diets (1–3% as calcium carbonate), but in the light of these findings it was thought wise to see whether the added calcium was affecting the iron balances. Accordingly, the results of seven of the subjects, whose metabolism was studied for a sufficiently long time, were subdivided into periods when the bread was and was not

reinforced with calcium, and the results are shown in table III. It will be seen that the addition of calcium certainly did not interfere with iron absorption. If anything it appeared to facilitate it, but the differences are too small to warrant the drawing of any conclusions.

TABLE III—AVERAGED IRON BALANCES AT DIFFERENT LEVELS OF CALCIUM INTAKE

	Type of bread	Average length of study (days)	Intake*	Excretion	Balance or absorption
			(mg./day)		
WOMEN	White	33	14·2	12·3	+ 1·9
	White + calcium	28	16·3	14·0	+ 2·3
	Brown	37	21·8	21·4	+ 0·4
	Brown + calcium	42	22·6	21·8	+ 0·8
MEN	White	30	18·8	17·5	+ 1·3
	White + calcium	28	19·6	17·8	+ 1·8
	Brown	29	26·6	26·2	+ 0·4
	Brown + calcium	39	29·2	28·7	+ 0·5

BROWN BREAD AS A SOURCE OF IRON

The finding which seems to demand discussion is that the men and women, each and all, absorbed more iron from white bread than from brown. They did this in spite of the fact that the intakes were 50% higher in the brown bread experiments. This difference in absorption cannot have been due to changes in the diet other than bread, for there were almost none, and 3 or 4 weeks on white bread alternated with 3 or 4 weeks on brown throughout the 9 months of the experiment. The explanation cannot be that the iron in the whole wheat is present as an unavailable hæmatin compound, for the proportion of the iron present in inorganic form, as determined by the αα′ dipyridyl method, is high (Shackleton and McCance 1936, McCance 1939). It may partly be explained by the indigestible nature of the branny particles in the brown bread and by its laxative action. Even soluble metals such as lithium (Kent and McCance 1941) and potassium (McCance and Widdowson 1942) are less completely absorbed from brown than from white bread diets. In this dilemma, one's mind naturally turns to phytic acid, which is present in large amounts in brown bread, and which has already been shown to depress the absorption of dietary calcium and magnesium by precipitating these metals in the gut. The ferric salt of phytic acid is even more insoluble under certain conditions than the calcium and magnesium salts, and, in fact, ferric chloride is a reagent commonly used for the precipitation of phytic acid in the chemical estimation of this compound. Apart from phytic acid, moreover, brown bread diets contain more inorganic phosphate than do white, and ferric phosphate is a compound which must be insoluble at the pH of the intestine. A number of workers (Cox et al. 1931, Brock and Diamond 1934, Rehm and Winters 1940) have produced a lowering of the blood phosphorus and rickets in rats by incorporating large amounts of iron salts in their food. If an excess of iron will precipitate phosphate in the intestine and render it unavailable, may not the converse be true, and an excess of phosphate precipitate the iron? (Day and Stein 1938.)

The iron in whole cereals appears to be effective in curing nutritional anæmia in the rat (Rose and Vahlteich 1932, Rose and Kung 1932, Rose, Vahlteich and MacLeod 1934, Free and Bing 1940), and the addition of sodium phytate to the diet of anæmic rats does not seem to inhibit hæmoglobin regeneration to any great extent (Harrison 1942). The intestine of the rat, however, secretes a phytase (Patwardhan 1937), and rats can absorb phosphate more readily than some other animals, so great caution is necessary in applying the results of these experiments to man.

Whipple and Robscheit-Robbins (1925) and Robscheit-Robbins (1929) found that "bread" promoted hæmoglobin regeneration in anæmic dogs less well than any other food or mixture of foods which they investigated. This bread was made from a mixture of ordinary bread flour (presumably white) and bran, in the ratio of 6 : 1, together with potato starch, sugar, canned tomatoes and cod-liver oil. A mixture of white flour and bran in this proportion would approximate in chemical composition to the 92% extraction flour used in the present experiments.

Experimental evidence as to whether whole cereals promote or inhibit the absorption of iron in humans is very meagre. Summerfeldt, Tisdall and Brown (1932) and Ross and Summerfeldt (1935, 1936) have fed a group of children on a special cereal mixture of their own and compared their hæmoglobins with those of a control group to which ordinary cereal such as oatmeal was given. Since their special cereal contained twelve times as much iron as the oatmeal, there is little wonder that the response was better on the special food.

Vahlteich and others (1935) carried out a balance experiment on two women, in which they set out to compare egg yolk and bran as sources of iron. Unfortunately, their experimental periods were too short (7–9 days in all) and their preliminary period quite inadequate (1 day) for their results to have much meaning. Taking the results for what they are worth, both subjects were in slight negative iron balance on both types of diet.

Evidence that cereals may not be a good source of iron comes from the careful study of a baby boy, who was metabolised continuously for 10 months (Oldham, Schultz and Morse 1937). He retained iron satisfactorily when his basal diet was supplemented with spinach, peas, meat or an iron salt. He absorbed no iron, however, when the supplement was 'Vio-Bin,' a wheat-germ preparation, even though this contributed as much iron as the other supplements, and 92% of it reacted with αα′ dipyridyl.

Brown bread is always confidently recommended as a good source of iron, but there seem to be various reasons why this opinion should be revised. Chemically there is much to be said against it. Previous experimental work on dogs and humans has been, to say the least of it, unconvincing. The present results suggest that brown bread is a poor source of iron. The level balances on brown bread are not so obviously damning as they would have been if negative balances had been obtained, but our theory of the way in which iron is absorbed and excreted explains why negative balances were not obtained and should not have been expected, even if phytic acid seriously interfered with the absorption of iron. It is suggested, therefore, that brown bread as a source of iron requires further investigation. Children's retentions of iron on white and brown bread diets might usefully be compared, but long periods of investigation would be essential if the evidence to be obtained is to be of real value. Meanwhile it might be wiser not to lay too much stress on brown bread as a food rich in iron.

SUMMARY

The iron balances of four men and four women were studied over a period of 9 months to a year.

The menstrual losses of three women were characteristically different one from another but very constant for any one woman from month to month.

Iron was absorbed from diets in which white flour constituted 40–50% of the total calories.

Iron was not absorbed from similar diets when the white flour was replaced by one of 92% extraction.

It is suggested that, in spite of the large amounts of iron in whole wheat, bread made from it may not be as good a source of iron as is generally supposed.

* We are indebted to the subjects for their collaboration in these long and exacting experiments. The expenses were largely defrayed by the Medical Research Council, and E. M. W. is in the wholetime service of the Council.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of Neurology held at the Wingfield-Morris Orthopædic Hospital, Oxford, on April 18, with Brigadier GEORGE RIDDOCH in the chair, a discussion on

Peripheral Nerve Injuries

was opened by Prof. H. J. SEDDON, who outlined a clinico-pathological classification that had been found of value in the work being carried out at the Oxford Nerve Injuries Centre. He pointed out that since Weir Mitchell gave the first accurate description of irritative nerve lesions seen during the American Civil War the incidence of such conditions has almost certainly fallen. Lesions seen during the present war, many of them due to injuries in no way different from those encountered in civilian life, are almost all of the paralytic variety—that is to say, damage to the nerve is manifested by loss of function rather than by perversion of function. The classification he described takes no account of irritative lesions except in so far as they are accompanied by paralytic phenomena. Changes following division of a nerve are so well known as to require little elaboration; operative repair is always required and except in the case of the radial nerve functional recovery is usually imperfect. A lesion in continuity can be produced by any injury that does not cause actual disruption of the nerve—a near miss, traction or compression. It can be produced experimentally by crushing the nerve with forceps, and however produced there is always complete peripheral degeneration. But spontaneous recovery is almost invariable, and the quality of recovery excellent; experimental evidence shows that the characteristic feature of a lesion in continuity is the preservation of more or less of the supporting structure of the nerve which not only prevents retraction of the broken axons but ensures that subsequent regeneration will proceed along the correct anatomical channels. J. Z. Young has observed that the absolute rate of regeneration after a lesion in continuity is invariably greater than the rate after division and immediate suture of a nerve. Although sufficient clinical evidence has not yet accumulated Professor Seddon was inclined to think that the same is true in man. The third type of lesion, transient block, is much less serious. Again the paralysis can be produced by a near miss, by compression or traction. Clinically, paralysis is always found to be more marked on the motor side, but the reaction of degeneration is never found in the affected muscles and recovery occurs with great rapidity. There is nothing to suggest any degenerative change in the axons peripheral to the lesion. At present there is no hint of the exact pathology of the condition.

Mr. W. B. HIGHET described the various types of dissociated paralysis found after a partial nerve lesion—i.e., partial division, an incomplete lesion in continuity, and transient block, the last being invariably a dissociated form of paralysis. It is not always easy to distinguish between complete and incomplete lesions. If one fails to recognise such anomalies as double innervation (for example of the thenar muscles), and the early shrinkage of the area of sensory loss due to overlap by neighbouring normal nerves, a complete lesion may be regarded as incomplete and treated conservatively when the correct treatment is exploration and repair. An essential diagnostic measure is procaine blocking of the injured nerve or of one of its neighbours; by this means all anomalies can be readily recognised and true sensory regeneration can be distinguished from shrinkage by overlap. Division of isolated nerve branches should be distinguished from incomplete lesions of the main nerve trunk, especially in the case of the posterior interosseous and lateral popliteal nerves. The type of dissociation in incomplete lesions depends on the anatomy of the intraneural plexus at the level of the lesions. At certain well-known sites there is an aggregation into a discrete bundle or funiculus of the nerve-fibres destined to leave the main nerve trunk as a branch or series of branches. If a nerve is partially divided at a point just proximal to the origin of branches a funicular type of dissociated paralysis is found, the distribution of the paralysis corresponding exactly with the part of the nerve that has been damaged. If however the injury occurs a considerable distance proximal to the origin of branches and where the intraneural topography is complex a non-funicular dissociation results. In this type of lesion there is a more or less generalised depression of function in the nerve but all nerve-fibres are not equally vulnerable. There is often a selective effect on nerve-fibres of different types. The large fibres—motor and proprioceptive—almost always prove more vulnerable than the smaller fibres subserving the various forms of cutaneous sensation and the least vulnerable of all are the smallest fibres subserving sweating and slow pain. Transient block is a good example of this modal dissociation, but Mr. Highet gave examples of this type of dissociation in which the larger motor fibres had undergone complete degeneration whereas the smaller fibres remained intact.

Dr. GRAHAM WEDDELL gave an account of the anatomical investigation of cutaneous sensibility. With dilute methylene-blue it is possible to stain the finest nerve-fibres and their endings in the living skin. After removal of the specimen fibres can be traced over great distances and their final distribution determined with great accuracy. It has been found that the various sensory end-organs lie at different levels beneath the surface of the skin, and that each sensory spot receives more than one fibre from the cutaneous plexus. Recently this work has been extended to cover the changes occurring during degeneration and regeneration of cutaneous nerves. The painstaking clinical observations of Trotter and Davis have been confirmed, the early shrinkage of the sensory area has been explained by the ingrowth of fibres from neighbouring normal nerves, and no evidence has been found to support Head's theory of two separate forms of sensibility, protopathic and epicritic. During the process of regeneration the new fibres grow most rapidly in the part of the skin immediately adjoining a normally innervated area, so that reinnervation is, in general, seen first at the periphery. In the early days the sensory end-organs receive less than their proper complement of fibres and during this period clinical observation shows that sensibility is imperfect. It seems likely that the early and late forms of sensory recovery described by Head and Rivers can be explained on this basis.

Dr. LUDWIG GUTTMANN discussed recovery of sweating in relation to pain and touch. In analysing the course of functional recovery of sweat glands three stages can be distinguished: (1) restitution of sweating in the intermediate zone of an interrupted nerve by overlap from the adjacent nerves; (2) functional recovery of sweat glands in the autonomous zone of the interrupted nerve due to true regeneration; and (3) functional reorganisation of sweat glands after complete recovery. In none of the cases of traumatic lesion has this final stage been evident, and sensibility has likewise remained impaired. In general, recovery of deep cutaneous pain precedes the return of sweating, superficial cutaneous pain and coarse touch. As a rule sweating and pain

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sensibility to superficial or medium pin-prick stimuli recover together, followed more or less closely by coarse touch. Recovery of normal touch is always long delayed—it may never return after nerve suture following gunshot injuries—although sweating and coarse touch have returned long ago. In certain cases where regeneration is delayed (e.g., late suture) sweating fails to return in spite of good sensory recovery; this may be explained by irreversible atrophy of the sweat glands. From the practical point of view investigation of sudomotor changes is of value in being a purely objective check on sensory examination.

Reviews of Books

Anæsthetics Afloat

Surgeon Lieut.-Commander RONALD WOOLMER, B.M. Oxfd, D.A., R.N.V.R., anæsthetic specialist, R.N. medical service; late senior resident anæsthetist, St. Thomas's Hospital. London: H. K. Lewis. Pp. 120. 6*s*.

THIS is a simple practical manual written for the inexperienced anæsthetist afloat, and makes no pretence at being anything more ambitious. Writing of intravenous anæsthesia, the author gives a glimpse of the maritime lot in this encouraging sentence: "When negotiating a ladder or a hatchway the syringe can quite well be carried in the mouth." Further evidence that the Navy is equal to anything is to be found in a paragraph on the choice of anæsthetic for ruptured ectopic gestation. The book is written by a teacher of experience and includes many valuable tips; but it is marred by the proposal that 2 c.cm. of 1 : 1000 adrenaline should be given intravenously for an ill-defined anæsthetic difficulty, and that adrenaline (dose not stated) should be injected into the heart muscle for the treatment of ether convulsions. These pieces of advice might well result in the cardiac emergency, later described, in which "the heart stops abruptly between two beats." The suggestion that a patient suffering from ether convulsions should be placed in the Trendelenburg position is not likely to commend itself to the experienced anæsthetist. The section dealing with postoperative pulmonary complications is excellent and follows Brock's teaching closely, but the chapter on local anæsthesia is mediocre and does not ring of practical experience; the naval rating is indeed hardy if he submits to circumcision under 20–25 c.cm. of ½% novocain injected as described.

Body Mechanics

In Health and Disease (3rd ed.) JOEL E. GOLDTHWAIT, M.D. LLOYD T. BROWN, M.D., LORING T. SWAIM, M.D., JOHN G. KUHNS, M.D., WILLIAM J. KERR, M.D. London: J. B. Lippincott and Co. Pp. 386. 30*s*.

IN this new edition much has been rewritten and greater emphasis is laid on the prevention of postural deformities and of chronic disease. Dr. Goldthwait and his colleagues combine the attitudes of osteopath and orthopædic surgeon; their work is known almost as well here as in America, though we have never favoured their conception that body mechanics influence such diseases as diabetes, cardiac angina, muscular atrophy. They regard postural training as a prophylactic measure in childhood and in adults as an aid to recovery, especially in chronic disease. Many of the deformities in children illustrated in the book, however, are obviously rachitic. It is putting the cart before the horse to speak of body mechanics in relation to a nutritional disease bound by its nature to cause deformity. Dr. Goldthwait holds that postural training should be the aim of physical recreation and activity in schools. The difficulties inherent in the upright position seem to be overcome by naturally living native races. Poor postural physique is the outcome, not so much of the upright position as of the sedentary and overcivilised lives that most of us live. Children in the growing years should therefore be safeguarded against the drawbacks of malnutrition and indoor, sedentary classwork. We recognise as much, but the book may stimulate school medical officers to take a greater interest in postural training. The Central Council for Recreative Physical Training is helping to maintain postural training in clubs and industry among young adults. According to Dr. Goldthwait such efforts will in the long run prevent a deal of minor disability, injury and disease.

Handbook of Hygiene

(2nd ed.) JOSEPH W. BIGGER, M.D., Sc.D. Dubl., F.R.C.P.I., D.P.H. London: Baillière, Tindall and Cox. Pp. 414. 12*s*. 6*d*.

THIS useful book deals clearly with those aspects of hygiene which concern the general practitioner, without going into details of sanitary law which affect the medical officer of health. The information is accurate on the whole, but there are one or two omissions; for example, there is no reference to the increased incidence of tuberculosis since the outbreak of war, or to the fact that still-births are now registrable in Scotland; and the list of industrial diseases notifiable to the inspector of factories could be brought up to date. Dr. Bigger holds that only two qualities of milk should be sold: raw milk, from healthy tuberculin-negative cows, produced under properly controlled and inspected conditions and containing not more than 20,000 bacteria per c.cm. and no coliforms in 1 c.cm.; and milk produced from cows living under reasonably clean conditions and judged healthy on veterinary examination—this milk to be pasteurised. The closing chapter on the relation of the general practitioner to the public health service has been contributed by Dr. C. J. McSweeney. The book marks an advance towards the proper teaching of public health to undergraduates, who have too long been invited merely to consider drains.

Year Book of the Eye, Ear, Nose and Throat, 1941

Editors: LOUIS BOTHMAN, M.D., SAMUEL J. CROWE, M.D. Chicago: Year Book Publishers; London: H. K. Lewis. Pp. 648. 16*s*. 6*d*.

A RECURRENT new year pleasure is the receipt of this small American book. This year, as usual, the published work has been thoroughly combed, and is displayed agreeably as well as critically. The first section summarises recent work on ophthalmology, giving a good account of medical and surgical methods. The research student and the clinician will find it informative about rare conditions; a special article has been written on clinical manifestations of allergy in ophthalmological cases. The special article on aviation medicine relating to the ear, nose and throat is outstandingly good, showing as it does how much research on the subject is being carried out all over the world. In America the Aviation School of Medicine is fully engaged in the investigation of flying problems, and has apparently been busy on them for over twenty years; yet we heard relatively little of this branch of otolaryngology in the years before the war. Two big problems are the effects of noise on hearing, and of changes of pressure on the middle ear and sinuses; and all the work done on them, to date, is reviewed. Coming down to earth, much of the prewar work on the surgery of otosclerosis is now ripe for scrutiny. Claims of success in treatment have been over-optimistic and under-critical. Fenestration of the labyrinth capsule can relieve the condition, but the technical difficulty of regularly achieving a permanent opening has yet to be solved. Menière's syndrome is being treated at the Mayo Clinic by intravenous histamine on the theory that capillary permeability in the end-organ is the causative factor. On the other hand, Dandy is convinced that the end-organ is not the seat of the trouble, and advises section of the nerve, stating that he obtains permanent cures in nearly every case; his operative record of 1 death in 401 operations is impressive. A review of papers covering chemotherapy in its clinical aspects is given, together with an advance note on gramicidin; this bacteriostatic agent, crystallised from an anaerobic sporulating soil bacillus, is an interesting foretaste of things to come. A swing back towards surgery is noticeable in the treatment of carcinoma of the larynx, but this may be fallacious, since none of the papers reviewed is by a radiotherapist. A new type of broncho-œsophagoscope is described, which permits alterations in length and lumen of the tubes, with alternative use of proximal and distal illumination, and enables the smaller bronchi to be inspected. The book is packed with good stuff.

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[1] *British Medical Journal*, 1935, November 16th, p. 938.
[2] *British Medical Journal*, 1938, January 15th, p. 105.

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THE LANCET

LONDON: SATURDAY, MAY 16, 1942

EQUIVALENT OR MAKESHIFT?

THE German word *ersatz* (substitute) has come down in the hierarchy of words: it used to mean equivalent and now, owing to the damnable necessity of war, it means makeshift. The Franco-German war of 1870 gave birth to margarine; the war of 1914–18 familiarised us with a whole scale of substitutes; and the present war has brought on the market dozens of catchpenny and other makeshifts—mainly, as yet, for foods. Now to the dietitian and the gourmet, not to speak of the allergic, there are no such things as food substitutes. Citric acid, sugar and a greenery-yallery aniline dye do not synthesise lemonade made from fresh lemons, nor will hardened whale-oil emulsified in soured skim milk ever replace butter. But undiscriminating folk may be beguiled by, may even rejoice in, *ersätze*. It is reported that children after the last war preferred margarine to butter and that in the present war they welcome with acclaim ice-cream made from a synthesised cream, which knows more of the monkey nut than the cow, and the flour mill than the dairy farm. Some of the *ersätze* have no doubt come to stay—e.g., margarine and lard substitutes; they have for long been used in cooking, even perhaps in the kitchens of Mayfair and Belgravia. But there are others whose life history it may be hoped is more ephemeral; brought to birth by a shortage of the real articles they are destined to vanish again when peace banishes shortage.

No-one, least of all the dietitian, will deny the importance of colour, texture and flavour in food. To the public, who know nothing of dietetics, these are all-important. It is they which cajole the money from the pocket. And if, as in the examples of margarine, lard substitute and synthetic cream, a sound metabolisable product is offered in place of the real thing, little harm is done. Margarine is not as good as butter; it probably does not digest as rapidly in the human small intestine. But it is much better than no fat at all, especially when vitaminised. And "cream," synthesised[1] from a sugared flour-and-water paste in which is emulsified some hardened whale or arachis oil, may add a touch of luxury, not to speak of calories, to an otherwise bald and unconvincing bun. It is otherwise with the multitude of egg, milk and citrus substitutes against which our public analysts have to wage war.[2] The "egg powders"—or as they are now more correctly called "egg substitute powders"—are innocent, for the most part, of any connexion however remote with an egg, being composed of rice, starch or other finely ground cereal, baking powder and aniline dye. More recently, owing to the present shortage of eggs and the availability of other raw materials, a new type of egg substitute has been evolved, containing little or no baking powder but a fair proportion of soya-bean flour. Soya has a high nutritive value, but it is misleading the public to suggest that these substitutes are in any real way the equivalent of eggs. Successful prosecutions have been instituted against firms making claims such as these. Confectioners and wholesale bakers used to add skim-milk powder to their pastries, scones and other confectionery to produce that rich golden-brown colour beloved of the public. Now that milk products have been banned for confectionery a new chromogen has been sought and found in "milk powder substitutes." These consist largely of wheat flour as a diluent, with malt sugar, milk sugar, malted flour, or soya flour as the operative. No particular harm is done if the sale of these is confined to the wholesale trade, but unfortunately they have been placed on the retail market with directions for making custards and other dishes in which the housewife normally uses full-cream milk. Custard made with egg substitute (50–66% starch) and milk substitute (51–61% starch) must be both a culinary and a dietetic disappointment. Still worse are the citrus substitutes. These were intended for the retail market and consisted of citric or tartaric acids and colouring matter with or without added vitamin C. The claims made on the packets were grossly overstated—e.g., "this bottle contains the equivalent properties of sixteen squeezed lemons." On investigation it was found that this bottle contained 80 IU (4 mg.) vitamin C against the 3840 IU (192 mg.) which it should have had. The Ministry of Food's order prohibiting the manufacture or sale of vitamin C except under licence has cut off the source of this vitamin for packers of substitute lemon and orange juices, and the public analysts have the duty of seeing that claims made on packages of coloured citric acid are not unduly exaggerated.

Fortunately there is legislation to deal with the whole problem of food substitutes. Under section 6 of the Food and Drugs Act, 1938, incorrect or misleading claims made on labels and in advertisements can be dealt with; and under the Food Substitutes (Control) Order, 1941, all food substitutes must be manufactured under, and in accordance with, the terms of a licence granted by the Ministry of Food. Under our present economic system it is essential for this control to be continued after the war is over; the CHANCELLOR has just reminded us that essential foods will be short for years to come, and in an acquisitive society the temptation of cashing in on the people's needs is too great to be withstood. After all, is that not orthodox economics?

1. *Lancet*, Feb. 7, 1942, p. 173.
2. Walker, G. H. *J. R. sanit. Inst.* 1942, **62**, 85.

DIVORCE FOR INSANITY

Mr. A. P. HERBERT would hardly have secured the passing of his Matrimonial Causes Bill in 1937 if he had waited till every imperfection and uncertainty had been removed from his proposals. After four years' experience of the working of the Act we can now see the points where amendment would be profitable. A valuable paper by Mr. WILLIAM LATEY and Mr. D. HARCOURT KITCHIN, read before the Medico-Legal Society last month, contains useful suggestions. In particular, when Parliament permitted divorce for incurable insanity and evolved a formula of five years' continuous "care and treatment," anomalies were bound to reveal themselves. The act takes too little notice of the temporary mental treatment which the legislature sanctioned in 1930. Voluntary treatment is allowed to count

towards the five-year period, if it follows without interval a stage of detention under a lunacy order. If, however, there is a voluntary patient who comes within the Herbert Act through having been originally certified, and if he is discharged to relatives with a view to re-certification, the five-year period is interrupted by the discharge notwithstanding that the insanity persists. There would be no interruption if the voluntary patient were certified without his leaving the mental hospital; but this course, it seems, is generally avoided out of a desire not to compromise the voluntary status. Suppose again that a certified patient escapes from a mental hospital. He may be recaptured within 14 days on the authority of the manager without fresh order or certification. If he remains at large for more than a fortnight, the law requires him to be re-certified. Does this break the continuity of the statutory five-year period and deprive the sane spouse of the right to a divorce? The patient's insanity has not been interrupted. Yet another problem is presented by those elderly patients who, though incurable, are so harmless that they can live comfortably under a little supervision with relatives or with guardians found by voluntary agencies. If such patients are actually discharged, then there is no statutory insanity "under care and treatment" to give the sane spouse a remedy. If the order remains and there is an indefinite period of probation, is the five-year continuous period of care and treatment interrupted?

Whatever the doubts to be removed, the chief obstacles to amendment appear to be two. First our legislators hesitate to touch a topic where they fear controversy. Scotland can reform her divorce law and her marriage law without excitement; in England it is otherwise. Secondly the statutes which deal with insanity need to be rewritten altogether. The Act of 1890, upon which the new conditions of temporary and voluntary treatment were grafted in 1930, is altogether behind the times. Whitehall has had to take notice of the administrative errors disclosed in the cases of Hall *v.* Hall and Murray *v.* Murray in 1940. Patients after a long spell of treatment in a mental hospital sometimes settle down into a harmless chronic but incurable state and may then be released to a special institution, thereby freeing beds in the mental hospital for fresh patients whose condition hospital treatment may improve. When these harmless chronic patients are pauper lunatics or, as we now call them, rate-aided persons of unsound mind, section 25 of the 1890 Act authorises their transfer to a "workhouse" on completion of two certificates. One certificate is that of the medical officer of the hospital, declaring that the patient has not recovered and that he or she is a proper person to be kept in the workhouse as a lunatic. The other is that of the medical officer of the workhouse, declaring that there is accommodation available there. Unfortunately the second of these certificates has frequently been omitted. The technical result is that the reception and detention of the patient are illegal and, the patient not being "under care and treatment" within the Herbert Act, the sane spouse has no remedy. Doubtless these irregularities of certification have mostly been corrected by subsequent recourse to the usual justice's order granted on two medical certificates; but the would-be petitioner for divorce has to wait while a fresh five-year period runs its course. Legislation is understood to be in prospect for curing the illegality which these cases have disclosed. The draftsman must have found himself bewildered by the tangle of the old law and the new. Improvement of our divorce law, therefore, is bound up with improvement of our lunacy law. The latter is the greater social need, though the former may illustrate its urgency.

EXTRAPERITONEAL CÆSAREAN SECTION

PATIENTS submitted to cæsarean section can be divided into three groups. There are those in whom the operation is performed in late pregnancy, or at the onset of labour, and who have had no vaginal examination. There are those who come to operation after labour has been in progress some hours and who have had one or two vaginal examinations under aseptic conditions. And lastly there are the patients operated on at the end of a long labour, who have had many vaginal examinations perhaps carelessly performed, whose membranes may have been ruptured for many hours and on whom unsuccessful attempts at vaginal delivery may have been made. For the perfectly clean cases in the first group section may be performed either by the classical method originally described by SANGER or by the lower segment transperitoneal operation. The classical section is adequate, if not ideal. Most modern operators prefer the lower segment route even in absolutely uncontaminated cases because convalescence is more comfortable, there is far less liability for adhesions to form between the uterine scar and coils of intestine, and the suture line is said to be firmer and less liable to rupture in a subsequent pregnancy or labour. For patients in group 2 the lower segment operation has decided advantages over the classical route and is unquestionably the method of choice. Infection in the puerperium has always to be reckoned with in these cases. Should it occur in the region of the scar then it is usually well away from the dangerous placental site, and in the best situation for drainage. Should a peritonitis supervene it is more likely to be localised to the lower abdomen and therefore considerably less dangerous than an infection originating from a classical incision. Thus as a general rule no cases in the second group should have the upper segment operation.

The treatment of patients who have had considerable interference and are infected at the time of operation is not so clearly defined. Operators fall into two camps—those who advocate the lower segment transperitoneal operation or some modification of it, saying that the peritoneum is quite as capable as any other structure of coping with an infection, and those who hold that if possible the operation should be completely extraperitoneal so as to minimise the risk of peritonitis. The Latzko operation is designed so that all manipulations are carried out extraperitoneally. The bladder is distended before operation, and a left paramedian incision is made down to, but not through, the peritoneum. This structure is then dissected off the top of the posterior part of the bladder, and working extraperitoneally dissection is continued until the lower anterior surface of the uterus is displayed. The uterus is then incised either vertically or obliquely, the incision extending well down to the region of the

cervix, and the child is extracted. WATERS has described a modification of this operation in which the lower uterine segment is incised transversely, a semilunar cut being made just as in the usual transperitoneal method, but at a higher level than in the Latzko operation. There are of course many disadvantages to these procedures. They are technically difficult, the cellular tissues are disturbed and there is considerable risk of cellulitis, thrombosis and embolus. The large veins in the region of the broad ligament are exposed and several cases of very severe hæmorrhage have been reported. Great difficulty is often encountered in the extraction of the child, and the fœtal mortality is higher than in the transperitoneal operation. The peritoneum is frequently opened by accident during the approach and there is a very real risk of injuring the ureters and the base of the bladder. Despite these difficulties and dangers COSGROVE and NORTON [1] of New Jersey, using a Latzko technique in some cases and a Waters technique in others, have performed 209 extraperitoneal sections. Their results are impressive; there were only 4 maternal deaths in the complete series and only 11 babies were lost. Since many of their cases were operated on late in labour and some were undoubtedly infected at the time of operation these results merit careful consideration. Complications in the puerperium were few, probably because the uterine incision was made transversely and a little higher up than in the true Latzko operation and thus the dangerous area in the region of the base of the bladder and the ureters was avoided.

In obstetrics as in general surgery it is a good principle to perform a simple operation rather than a difficult one provided the same results can be achieved. For most cases seen late in labour where cæsarean section is indicated a well-planned transperitoneal operation performed under local anæsthesia involves the minimum of trauma to the maternal tissue, does away with the dangers of inhalational or spinal anæsthesia, is not unduly difficult to perform and yields good results. But in the occasional case where the patient has had a good deal of interference and is already infected it seems justifiable to subject her to the additional trauma of the extraperitoneal operation, and COSGROVE and NORTON say it is not too difficult for any reasonably experienced obstetric surgeon to tackle.

FUEL RATIONING

Three fuel coupons equal 1 cwt. of coal, 1½ cwt. of coke, 5 therms of gas, 90 units of electricity or 2 gall. of paraffin.[2]

Twenty-five years ago BEVERIDGE and TALLENTS were helping the Food Controller assess the caloric value of the internal fuel that drives human activities and its equitable distribution. Now they are associated in a scheme to restrict equitably the consumption of external fuel, which the Minister describes as a most important and intricate problem. Not so important perhaps as the food problem where an adequate ration is a matter of life and death, but maybe more intricate because the personal consumption of fuel varies within undefined limits and is largely a matter of custom and comfort, whereas the person may spend more on his modicum of food but cannot consume much more than his share. Goodwill and ingenuity can no doubt achieve some saving in fuel without material loss of comfort and the sacrifice of comfort can save much more. We do not yet know the extent of the sacrifice that will be called for beyond the hint in the report that an average cut of 12½% all round would secure a saving of ten million tons of coal in a year. But we do know that the distribution of fuel will be based on present needs and not on past use. It was lamentably obvious during the long cold spell of the late winter that the smaller consumers, especially perhaps in London, Birmingham and Glasgow, were often unable to cover their modest needs. It is the aim of the scheme, as the Lord Privy Seal has put it, so to plan distribution that everybody gets that minimum amount of fuel to which they are entitled, and which indeed they must have if they are going to live. If there is to be a shortage of supply it would, he said, be the essence of unfairness to ask the people of goodwill to forgo what they would like to have and leave the people of ill will free to use what the others have forgone. Hence we are to have not appeals but directions. Sir STAFFORD CRIPPS agreed that there will be special cases which should command consideration. The bleak north will get more fuel for its longer winter. Old folks who crave for warmth more than appearance can exchange some of their clothing coupons for additional fuel. The needs of sick persons were also mentioned in the Beveridge report and the approved societies have asked for special attention to convalescents and the mother's need of her water for children's baths and laundry. Among the special circumstances justifying extra fuel for a household the Beveridge report mentions the doctor's consulting-room. What must have been in many people's minds seems hardly to have been uttered: ventilation must suffer in proportion as heating is diminished. Chimneys will extract less air, windows will be opened less, doors will be shut more closely. On the other hand in towns the air outside will be cleaner.

1. Cosgrove, S. A. and Norton, J. F. *J. Amer. med. Ass.* 1942, **118**, 201.
2. Exchange values suggested in Sir William Beveridge's report on Fuel Rationing to the President of the Board of Trade. In preparing his scheme he was assisted by Sir Stephen Tallents. (HMSO. Cmd. 6352. 2*d*.)

PHYTIC ACID AND IRON ABSORPTION

AT a meeting of the section of anatomy and physiology of the Royal Academy of Medicine in Ireland on March 14, Prof. D. C. Harrison quoted the experiments he made with Mellanby [1] demonstrating that the rickets-producing action of cereals is due to their content of phytic acid, which precipitates food calcium or otherwise inhibits its absorption from the gut. In view of the insolubility of ferric phytate it seemed possible that phytic acid might similarly interfere with the absorption of iron, leading to anæmia. To test this possibility Prof. Harrison took young rats which had been made anæmic by a diet consisting entirely of milk and divided them into two groups, giving one a supplement of iron (0·3 mg. of iron daily as $FeCO_3$) with a trace of copper, and the other the same with a further addition of natural sodium phytate (29–44 mg. of phytic phosphorus a day). The results were not conclusive, but the phytic acid appeared to produce a slight diminution in the hæmoglobin response to iron feeding. It seems clear, however, that under these experimental conditions the effect, if any, is only a small one.

1. Harrison, D. C. and Mellanby, E. *Biochem. J.* 1939, **33**, 1660.

Annotations

SULPHONAMIDE RESISTANCE

ALL the advantages of sulphonamide therapy disappear when a resistant organism is encountered, and an organism "fast" to one of the sulphonamides is usually fast to all the commonly used drugs of this group; the clinician must then fall back on pre-sulphonamide agents such as acriflavine and crystal violet. Development of sulphonamide resistance follows the same course as resistance to other antibacterial substances. It can be produced experimentally both in vivo and in vitro by repeatedly passaging or subculturing a susceptible organism in the presence of increasing concentrations of a sulphonamide. Resistance increases gradually and the final strain of, for instance, pneumococcus or streptococcus may be insensitive to saturated solutions of the drugs. Compared with resistance to many other drugs, sulphonamide resistance is easy to induce—it is evident in one, and can be maximal in six, subcultures. Its occurrence during sulphonamide therapy is therefore easily understood. From the known procedures by which it is developed experimentally one could deduce that resistance would be most likely to be produced when a patient was first given small doses of the drug, followed by a gradual increase, and such is the case. Hence the extreme importance of massive dosage from the outset in chemotherapy. Though easily induced, resistance to sulphonamides can be very persistent; a typical instance is of sulphapyridine-fast pneumococci produced during a few subcultures which maintained their virulence and resistance during more than two hundred subcultures in the absence of the drug.[1] The danger from the production of a resistant organism is unfortunately not confined to the patient in whom it is produced, for the virulence and invasiveness of further generations have been found to be as great as those of the parent strains, so that resistant organisms can be propagated in all the normal ways. Minor epidemics of such organisms have occurred,[2] and are one of the arguments for a more rigid dressing technique. Fortunately, resistance to one group of drugs rarely influences the susceptibility of organisms to a radically different group, though there are notable exceptions. Sulphonamide resistance, therefore, is best tackled by the development of a second line of defence in new antibacterial agents not based on *p*-aminobenzenesulphonamide, such as penicillin and its relations: antibacterial warfare must keep a mobile front.

ACTIVITY OF LIVER EXTRACTS

THE need for a test of the anti-anæmic potency of liver extracts that could be carried out on animals or in vitro has long been recognised, and the absence of a satisfactory test has meant that no reliable and enforceable standard, such as we have for insulin, is available. The USP has a system of units based on the results of clinical testing on patients with pernicious anæmia, but the basis of the system is not very precise though they undoubtedly give a rough guide to the dosage. Laboratory assay by recording the reticulocyte response to liver extracts in guineapigs and pigeons has been tried, but the results were not clearly distinguishable from normal variation. Treatment of experimental anæmias brought about by hæmolytic agents has also been unhelpful, as might have been expected since their pathology is entirely different from pernicious anæmia, nor has experimental gastrectomy—a difficult procedure—been successful. Pace and Fisher[3] of Richmond, Virginia, have drawn attention to a method using standard tissue-culture technique, originally described by the Swiss workers Overbeek, Gaillard, de Jongh and Yam. They planted out small fragments of bone-marrow from the femur of a guineapig into a mixture of guineapig plasma, saline and dilutions of liver extracts ranging from 1 in 5000 to 1 in 150,000. From these explants migrations of cells took place and after 15 hours' incubation the area of the migration field was measured. It was found that liver extracts stimulated migration and that there was a definite optimal dilution at which the largest migration field was produced; further, the more "active" an extract in terms of USP units the greater the dilution needed to produce this optimal migration. Hence, they say, this technique can be used to determine the activity of anti-pernicious anæmia liver extracts in vitro, and they found that if the clinical potency of an extract was destroyed—say by boiling for an hour with 2% sulphuric acid—the migration-stimulating properties were also destroyed. There are still many points to be explained. For instance, Pace and Fisher do not mention the nature of the migrating cells (previous work has shown that they are usually fibroblasts and polymorphonuclear leucocytes); nor what relation their properties have to the pathology of pernicious anæmia; their control experiments also seem inadequate. But the method will certainly have important applications if further work shows it to be sufficiently reliable; the Weil-Felix test serves to remind us that useful tests may be found in most unlikely circumstances.

1. Schmidt, L. H., Sesler, C. and Dettwiler, H. A. *J. Pharmacol.* 1942, **74**, 175.
2. Francis, A. E. *Lancet*, 1942, i, 408.
3. Pace, N. and Fisher, R. S. *J. Pharmacol.* 1942, **74**, 256.

CIRCUMSTANTIAL EVIDENCE AGAINST THE STARLING

IN a study[1] of the spread of foot-and-mouth disease W. S. Bullough points out that the great majority of outbreaks are easily explicable on the grounds of direct contact between cattle, or of the infection of food-stuffs or bedding, or of the movements of people or vehicles. But there remain those "mysterious outbreaks," from which the others are derived, occurring, he says, almost anywhere and at any time of the year, separated from the nearest infected centre by (perhaps) hundreds of miles or from the last outbreak by many months.

To explain these initial foci Bullough builds up a case for the prosecution against the starling as a mechanical carrier for which many an honest juror may be prepared to convict. To begin with it is the one common species of British birds intimately associated in very large numbers with pasture land, farms and cattle. It frequently feeds within inches of the noses and feet of the grazing animals and will go so far as to perch on their backs. In the winter it will follow them into the cattle sheds and remain in equal proximity. In other words the accused was certainly "in close association with the deceased" and its movements in time and space must be inquired into. Such inquiry bodes ill for the starling. Migrating from Norway its habit is to go to Scotland; from other parts of the continent it prefers England and Wales. The disease is rare in Scotland and almost non-existent in Norway; it is common in England and Wales and very common in Sweden, Denmark, Germany and Holland. For instance in 1925 the numbers of outbreaks reported were over 50,000 in Denmark, nearly 5000 in Sweden and none in Norway; there were 232 outbreaks in England and Wales and 0 in Scotland. Observe, next, its roosting habits. It may fly 40–50 miles a day from its feeding grounds to roost nightly shoulder to shoulder with some 50–100,000 birds, an admirable opportunity for the transfer of infective matter and another "mysterious outbreak" a hundred miles away. Counts of these roosts have been made by ornithologists and act as an index of the numbers of birds travelling about in each month of the year. Their trend, gentlemen of the Jury, runs nearly exactly parallel with the monthly incidence of unexplained outbreaks. Lastly, Bullough observes that in Sweden the starling is absent in autumn and winter, and

1. Communicated to the Royal Society, April 23, 1942.

the seasonal swing of the incidence of foot-and-mouth disease is the reverse of that shown for England and Wales. In Denmark it is present all the year round and outbreaks remain high too—though the incidence of unexplained outbreaks is not known in this case.

Counsel for the defence has not been heard, but if he were a wise old bird it is certain that his attack must instantly fall on Bullough's first premise—namely, that these mysterious outbreaks can be accounted for only by means of an introduction from outside and by an outside agency of the materies morbi. He will almost certainly quote the experimental epidemiologists—Greenwood, Topley and their colleagues—and talk learnedly of healthy carriers, latent infections and enhanced virulence by passage. He should at least be able to make the jury so sceptical of that first premise that it will disagree and leave the case against *Sturnus vulgaris* L. to be tried again.

NICOTINIC ACID RENAMED

To the American public the name nicotinic acid apparently conjures up a picture of a poison got from tobacco and made still more objectionable by being acid. The limit was reached when a trade journal, commenting on the proposal to enrich flour with this vitamin among others, headed its article "Tobacco in Your Bread." The name was an obvious choice when the compound was first produced in 1867, for it was made by the oxidation of nicotine and formed salts. Now, however, most nicotinic acid is made from beta-methylpyridine, a coal-tar derivative. To set the public mind at rest the food and nutrition board of the American National Research Council have approved the synonym "niacin" (pronounced nyasin) for nicotinic acid and "niacin amide" for nicotinic acid amide.[1]

COMBINED LIGATURE AND INJECTION FOR VARICOSE VEINS

Heyerdale and Stalker[2] find that in about half the patients treated for varicose veins at the Mayo Clinic there is incompetency of the internal or external saphenous veins, or of both; and that this incompetency may be associated with mild, moderate or severe varicosities. The only adequate treatment of these cases, in their opinion, is ligation and division of the incompetent vein, combined with injection of a sclerosing agent. By careful adherence to a standardised technique they have reduced the proportion of recurrences to a minimum. The division of the great saphenous vein is made at the fossa ovalis. This site is fixed by determining the point of maximal pulsation of the femoral artery at the lower border of Poupart's ligament, and measuring approximately 1 in. downwards and 1 in. medially. The line of incision is anæsthetised with 1% procaine hydrochloride, and an incision is made parallel with Poupart's ligament, with the fossa ovalis at its centre. The superficial fascia is incised in the same direction as the skin, and the vein exposed by blunt dissection, separated from its bed and doubly ligated with chromic catgut. Proximal to the ligatures, a curved clamp is put on the vein, which is divided between clamp and ligature. The stump is drawn up to reveal the junction of the three main tributaries, the superficial circumflex iliac, the superficial epigastric and the external pudendal veins. These are separately ligated and divided. By traction on the saphenous stump the sapheno-femoral junction is exposed and two clamps are placed on the stump which is doubly tied with chromic catgut just proximal to the clamps, the excess portion of the vein being excised. The sclerosing solution is injected into the distal portion of the vein, drawn up into the wound for the purpose. The solution used at the clinic since 1931 is sodium morrhuate; it does not cause sloughing when extravascular infiltration occurs in small amounts, and systemic reactions are rare and have always cleared up satisfactorily. The patient is allowed to go home on the completion of the operation, but is instructed to come next day for inspection, mainly to assure him that he is still ambulatory. Binding of the thighs at the site of very prominent and tortuous veins, and elastic bandages applied to the legs, are used to limit excessive local reaction. These bandages are removed and reapplied at the patient's first visit and the extent of the reaction noted. Further injections are determined by the judgment of the surgeon in individual cases. The skin stitches are removed on the sixth postoperative day. J. M. Waugh, in discussing Heyerdale's paper, said that recurrences after combined ligation and injection treatment in the last 4 years have been about 2–3%; in 700 operations there has been no fatality. At the New York Hospital, six different operative procedures have been used for varicose veins in the presence of an incompetent internal saphenous vein. Moore and Knapp[3] report that the best results have been obtained by simple high ligation and division, with injection of sclerosing solution at the time of operation. Their technique is essentially the same as that of the Mayo Clinic, but they prefer to have the patient in hospital. In ligaturing the stump of the saphenous vein they use a suture-ligature, but place a second ligature above this to prevent blood from coming in contact with the suture or damaged intima. In cases of serious incompetence of the connecting veins between the deep and superficial venous systems they ligature the saphenous at its upper end, and then at about the level of the knee, afterwards injecting the vein. They think well of this operation, but have not so far followed any cases over a long period. Determination of the incompetence of the saphenous vein and of the intercommunicating veins has been described by J. J. McCallig and Heyerdale.[4] With the patient standing, and a tourniquet controlling the upper end, a vein with incompetent valves in the intercommunicating veins will fill rapidly in 30 sec. Percussion of the vein, after removal of the tourniquet, will send an impulse down the incompetent saphenous vein which travels to the fingers at the lower end.

MOSQUITOES AND FIRE TANKS

Now that fire-tanks, obscurely labelled "static water," are a commonplace of urban life, people are beginning to ask whether such reservoirs are likely to serve as breeding places for mosquitoes, and if so what can be done about it. Mr. J. F. Marshall, director of the British Mosquito Control Institute, has studied both questions and sends us a reassuring answer. Of the 30 known species of British mosquito, 27 cannot be persuaded to lay their eggs in tanks; of the 3 less exacting species, one—*Culex pipiens*—rarely bites man, preferring birds. *Theobaldia annulata*, the second of the three, prefers to breed in foul water contaminated by sewage, while the last, *Culex molestus*, favours stagnant water in dark underground places and was the species found breeding in the London tubes during the winter of 1940. Thus open-air tanks containing uncontaminated water are unlikely to breed trouble except for the birds; underground storage tanks, however, especially if they get contaminated with sewage, may become the haunt of *Culex molestus*. A mosquito with a name so like an invocation should certainly be discouraged; the ordinary method of oiling the water, which we have all been taught as the ABC of mosquito control, will not meet the case here because so many tanks are asphalted to make them waterproof, and oil has a solvent action on asphalt. Incidentally oiling also kills fish and other creatures likely to devour the larvæ—though this is of purely academic interest here unless Lord Woolton is inspired to supplement our fish diet by stocking the

1. *J. Amer. med. Ass.* March 7, 1942, pp. 819, 823.
2. Heyerdale, W. W. and Stalker, L. K. *Proc. Mayo Clin.* 1941, **16**, 827.
3. Moore, S. W. and Knapp, G. M. *Ann. Surg.* 1942, **115**, 131.
4. *Proc. Mayo Clin.* 1941, **16**, 824; see *Lancet*, 1940, ii, 367.

tanks. But in any case it would be extravagant to use either oil or chemical larvicides until the presence of larvæ of a man-biting species has been demonstrated. This is such an easy matter that those who have the job of applying larvicide can be armed with pond nets and can supervise the tanks. Each net should be fitted at the bottom with a small glass vessel into which the water drains, the captured larvæ being then easily recognisable by the naked eye. Inspection need not be maintained between the months of October and March because the mosquitoes hibernate during the winter and lay no eggs. Thus the water in open air tanks need not be changed or treated between these months, and only requires attention if, during the summer, larvæ are found in it. When oiling must be avoided, the water can best be treated economically and effectively with coal-tar derivatives in proportions ranging from 1 part in 28,000 to 1 part in 50,000. These dilutions ought to be harmless to asphalt and bituminous linings, but the contractor should be asked to confirm this in each case. Underground tanks contaminated with sewage would be the most serious source of danger. It might be feasible to make the cellars in which they are housed proof against the gravid female *Culex molestus* seeking a place to deposit her eggs by fitting netting over the doors and windows.

BETTER FOOD ALL ROUND

STRANGE that rationing should mean better food for the country at large; and stranger still that we should take this revolution so much for granted. Prof. J. C. Drummond, addressing the Royal Society of Arts on May 6, justly complained that, had it happened in America, the government distribution of cod-liver oil and orange juice for every infant in the country would have excited more than a passing reference in the medical press. He reviewed the changes, nearly all for the better, which war has brought to our national table. In the first place gross nutritional inequalities have been considerably redressed—the most striking example being found in the free and cheap milk scheme, thanks to which the poorest families covered by official surveys are now drinking weekly nearly 3½ pints of milk per head; well-to-do families are drinking scarcely more than 4½ pints. Before the war families spending more than 18*s*. a week on food were drinking nearly 6 pints a head, while those who could not spend more than 5*s*. a week were unable to afford more than 1½ pints. The present milk consumption of the country is actually higher than it was in 1939, but Professor Drummond would like us to set our target 100% higher than it is now, taking care that the present equitable distribution is maintained. More school meals are being served; menus for elementary school kitchens are now planned to supply a balanced diet, and the principles of the Oslo meal are kept in mind. He explained why "nourishing soups," so often advocated for school-children, are not the panacea their champions fancy: they are too filling in proportion to their nutritive value, so that it is difficult to get 1000 calories into the child's stomach in this form, even when a thick soup is accompanied by a hunk of bread. The new 85% wheatmeal loaf comes in for its just share of praise, and it is noteworthy that surveys have shown active public dislike of a buff-coloured loaf to be a bogy; on the contrary, favourable comment has been widespread. Experiments in Canada[1] have led to the production of a white flour as rich in vitamin B_1 as 85% wheatmeal, and considerably richer than ordinary white flour in the other important nutrients of wheat. If a demand for white bread becomes loud after the war possibly flour of this Canadian type could be used, though Professor Drummond did not suggest it; no doubt he hopes, as we do, that the country will stick to the wheatmeal loaf. Experience with vegetable salads has been uniformly encouraging. When even moderate pains have been taken to get people to try salads in canteens they have been accepted and become popular. Shredded cabbage, grated carrot and potatoes are soon relished, and in many British restaurants a helping of such salads is served as a routine; it always gets eaten, and people say they like it. With an interest in salads comes a growing interest in allotments. Always a nation of gardeners we turn happily to raising vegetables. The Ministries of Food and Agriculture have recently shown that "a mere 300 square yards," as Professor Drummond put it, can provide all the vitamin C needed by a family of 4 during each month of the year, allowing liberally for waste and cooking losses; and the same crops will provide nearly half the vitamin A required by the family. Good food is an insurance against ill health which we have been slow to value; he pointed out that in Canada one of the largest insurance companies is contributing $500,000 towards the cost of the national nutritional campaign, in the belief that they are making a sound investment.

1. Tisdall, F. F., Jackson, S. H., Drake, T. G. H., Newman, L. H., Whiteside, A. G. O., Miller, H. and Edgar, J. *Canad. med. Ass. J.* 1941, **45**, 101.

HEAT AND SHOCK

ALL recommendations for the treatment and prevention of shock advise us to keep the patient warm. The value of warmth was demonstrated during the last war when shock was always more severe in men who had been wounded and had then lain exposed to cold for hours or days. But there is a tendency to interpret this advice by applying not merely warmth but heat to an injured patient. For this purpose electric blankets and heat cradles are widely used, and it seems necessary to say a word of warning about their indiscriminate use, particularly in the treatment of cases seen soon after the accident. Is the cold skin of the injured patient a pathological condition that requires correction, or is it part of the defence reaction of the injured organism? Blalock and Mason[1] incline to the latter view, and believe that the skin is cold because its normal blood-supply is pressed into service for more vital structures. They showed that animals submitted to "shocking" procedures survived longer if their body temperatures were kept at about normal than if they were artificially raised. Under the conditions of their experiments artificial cooling of the animals did not decrease the time of their survival. They say that by taking too active measures to heat up shocked patients their depleted volume of blood may be diverted from supplying important internal organs in order to carry away heat from the skin. Moreover unless it is designed and used with care a heat cradle may inflict severe burns on the drowsy or unconscious patient.

Mr. HUGH N. LINSTEAD, O.B.E., Ph.C., who was returned to Parliament at the Putney by-election on May 8, is secretary and registrar of the Pharmaceutical Society of Great Britain.

Mr. H. B. GRIMSDALE, who died at Hindhead on May 5 in his 76th year, was consulting surgeon to the Royal Westminster Ophthalmic Hospital and ophthalmic surgeon to St. George's.

We also regret to record the death on May 7 of Dr. RUSSELL ANDREWS, consulting obstetric physician to the London Hospital and one of the most popular clinical teachers of his time. He was 70 years old.

Colonel H. E. SHORTT, I.M.S., has been appointed physician to the King in succession to Major-General P. S. Mills, and Colonel J. S. S. MARTIN, I.M.S., hon. surgeon in succession to the late Colonel E. G. Kennedy.

1. Blalock, A. and Mason, M. F. *Arch. Surg.* 1941, **42**, 1054.

In England Now

A Running Commentary by Peripatetic Correspondents

I AM still here on the Rock. Close on seventeen months now. The time doesn't seem so long until you stop and think about it. I find the best recipe is to keep very busy doing nothing in particular. We are extremely well supplied with doctors in this place, and as another "medical specialist" has come out to keep me company I now just about fill in my mornings, with occasionally something to do in the afternoons. It seems to be the whim of the war to pay me more than I have ever been paid before (I am now a major), and give me as little work as possible. Mind you, I'm not complaining. . . . much.

Clinically life is very dull. In the last year I have seen about ten interesting cases, including some cases of typhus—these, I may hasten to add, did not occur here. We had a very interesting little outbreak of lymphocytic meningitis, which we are trying to write up, and that has been about the sum total. My card index is full of "N.A.D.," and an assortment of minor neuroses, the majority of which I am inclined to think are "try-ons," in my more jaundiced moments. But I am very kind to them all.

I have been twice for a week-end to Tangier. A nice enough little town, but it is rather invidious going over there because the troops can't go. However, they started messing about with bombs (you probably read about a small explosion there some months back), and now we don't go there, though it is supposed to be due to sterling restrictions rather than political ones. I go over the border to Algeciras on a Sunday sometimes, and have got to know a very delightful Spanish family with whom we lunch. It makes a nice break. That is, of course, the main crab about this place—being shut up. Otherwise it is the most perfect climate, heaps of sun, and in the spring there are masses of flowers all over the place, and the Rock looks quite pretty. I had always imagined that it was much more barren. I can quite imagine how people become attached to the place. The matron of one of the hospitals has, I believe, given up her home leaves in the past rather than risk being posted elsewhere, and I have met one or two civilian employees who sing the praises of a peace-time Gib.

Things have been embarrassingly peaceful, though maybe that will change now that the French are being stirred up to give more active support to Germany. The Italians did a so-called night raid here some weeks back. I'm told a bomb was dropped, but I haven't seen any, and there was certainly no damage done. I was very amused to hear of a most florid account in an Italian paper a few days later giving the story of how their "brave, multi-motored bombers wrought havoc here, started fires, and did much damage in the arsenal." The people who suffered most were the inhabitants of La Linea, across the border, on whom the bits rained down from our truly magnificent barrage.

I find plenty of time for reading, and Lewis's have come up to scratch very well in sending books out to me when I have written for them. There is also a first-class little garrison library, so I am trying to acquire a little culture—i.e., I take out a novel and a serious tome, read the novel, and return them both. I also play bridge a good many evenings a week, and read Culbertson. This, together with a lot of squash, tennis and painting the boat helps to make the time pass. It's all very shattering for my libido, which I have to sit on hard from time to time.

* * *

Conquest of disability is a very important subject, especially in and after war, but in Mr. J. C. Hardwick's booklet of that name, commendably free from slush, some of the advice is wrong (Student Christian Movement Press, pp. 65, 2s.). The ideal disabled patients—the ones who make the most of the limbs and senses that are left to them—are seen in veterinary practice. The crippled dog tries to carry on a normal life and is only held up by pain, breathlessness, or sheer muscular inability. Eventually his unreasoning persistence is rewarded by a hypertrophy of his good limbs and increased cunning. But the reward comes only after much wearying in which envy of the healthy plays a part and so does aggressiveness, both of which Mr. Hardwick deplores. Few can attain the fox-terrier standard, yet history has examples where overcompensation has amounted to greatness; a strong instinct of self-preservation with a logical belief that life is good, this is the dynamo of recovery, I agree; but I cannot accept Mr. Hardwick's advocacy of passive acceptance of disability—a detestable flabby heresy. Haven't the most successful patients been those who, marooned on the depleted Islands of Langerhans, have rationed themselves with zest and carried on? Or those who have played not a three-day but a life match with Koch's eleven and enjoyed it? Or one-legged men who have won swimming races? Or one-armed men who have downed burglars? Of course; struggle and zest are the keynote of conquest. Nor is enough emphasis given in this book to the fact that, even if our disabilities are such that we really are bedridden, still the best things are left to us—the thoughts and actions of mankind for three thousand years in books, perhaps the song of birds, perhaps the chance to watch things grow. Above all we can still think. The greatest adventures are not corporeal but mental.

* * *

Some of my colleagues grumble at the number of official circulars, but I find the information they contain invaluable. I have one grouse, however, and that is the tautology and diffuseness of official English. That mixture of the semi-legal and the leader style of the more ponderous weeklies, generously sprinkled with hideous neologisms such as "evacuee mother" and "deratisation," is irritating, obscure and confusing. And the conclusion is inescapable that the man who writes a woolly circular has a woolly mind. Most people think in words, and unless they have a due appreciation of the exact meaning of those words their minds are working with blunt tools. If I were in a position to insist, everyone who wrote official circulars would be familiar with Stuart Chase's "The Tyranny of Words," one of the half-dozen really important books of this century (incidentally it combines amusement with instruction). The unexpected appearance of verse in this column a week or so back put another idea in my head. R. L. Stevenson in one of his books (I think it is "Virginibus Puerisque") says that the best way to learn to write good prose is to write poetry. It needn't be good poetry, for that is a heaven-sent gift, but the stringencies of verse style teach one the value of the mot juste, the balance of a sentence, the necessity for compact statement, and the viciousness of redundancy. Of all forms of verse the sonnet is perhaps the most exacting, and is therefore the best exercise for the embryo stylist, so would it not be a good plan if official circulars were written as sonnets? A good many could easily be compressed into fourteen lines, and longer ones might make pleasant sonnet sequences. After all, medical treatises were written in verse in the 18th century—I have one on my desk, John Armstrong's "Preservation of Health" 1774. I offered this conceit to a colleague and was met by an immediate challenge to produce a sonnet circular. I have never written a circular (perhaps that is why I find it so easy to criticise them) and I have no claims to be a poet, but a bet is a bet.

Tumblers can be vectors of infection,
  Bacteria can lurk in drinking cups,
  And there is danger to the man who sups
Which yet he cannot spot by mere inspection.
Foremost among the pathogen-collection
  Is Vincent's spirochæte to which trench mouth
  Is due. Today it's spread from north to south,
A fact the MOH should now reflect on.
So we advise immediate control
  Of washing up in public eating houses.
    If live steam can't be had, then advocate
After a rinse, five minutes in a bowl
  Of chlorine water, and a few good souses
    Under the tap. Death is the germs' sure fate.

* * *

When I was at Yale they were conducting a series of experiments on Frustration and Aggression, into which, having no sense of direction, I occasionally burst. They frustrated rats by nipping their tails in doors, at which they became aggressive towards the nearest rat; this is not the time or the place to describe some of the ways in which they frustrated monkeys. But the point was that they showed in great detail that the natural response

to frustration is to attack a nearby weaker object, if possible living rather than dead. I thought of this the other day in the theatre. Everything went wrong. Quite large pieces of the table fell off, and the instruments were all the wrong size. The surgeon was the most frustrated of the lot, and he attacked housemen, not individually but as a species. His houseman made incomprehensible signs to the anæsthetist, who luckily had the patient. Sister, clashing her forceps as summons—for all the world like an amorous pelican—directed nurses from place to place, each time more bitterly incredulous at their slowness. The staff nurse moved me continually out of her, and my, way. There was present no-one weaker than myself and I nursed desires to spit on the instrument table, or in some other manner commit mayhem. At this stage the junior probationer dropped a tray. "Holy Mary, mother of God," said the surgeon, "what has the woman passed now?" I wondered if rats ever found relief in a sense of humour, and why they had to use rats anyway.

* * *

That staid business men sometimes secretly aspire to be explorers, or bishops bandits, read wild-west stories on the sly, hanker after some more primitive calling, is not a peculiarity of humanity alone, but of all cellular tissue. Evolution and civilisation cramp and confine and make specialists—"You shall be a physician or a plumber or a Peyer's patch"—but the opposing force, atavism, beckons back to the self-sufficiency of the savage and the freedom of unicellular life. Although many of us have come to regard the alimentary system as a bloated rentier, quietly absorbing the good things that come along, grumbling from time to time, but on the whole regular in his habits and sedate, I suspect him of longing to take part in the swaying activity of respiration. In the loach it has succeeded, for in times of stress this attractive little fish is a complete intestinal breather. The idea may seem strange to our habit-ridden minds, but in fact the mammalian method of breathing is a clumsy and inefficient affair, and even the hibernating frog who breathes through his surface vessels makes a much neater and quieter job of it. I see that you have lately backed the possibility of gases being excreted by the intestinal mucous membrane (Feb. 21, p. 234). I once heard W. O. Meek of Frimley Sanatorium declare that he was convinced that patients with dyspnœa excreted CO_2 into their intestines, and the pot. permang. colonic lavage for pneumonia may be relevant here. What a wonderful vista opens to our clinical vision: "This case of double pneumonia, Nurse, is getting very blue. Connect the gastric and duodenal tubes to the oxygen and give him 14 l.b. (international bubbles) a minute, and the colonic and rectal tubes to the suction apparatus. Reverse them every two hours. Remember to take his tyre pressure at the umbo and keep it within balloon-tyre limits (22–30). If his respirations go below 5 stop the oxygen. We'll feed him intravenously."

* * *

She lay in bed at the window with masses of flowers around her. The latest books were at her side, presents from many visiting friends who sometimes stayed to play bridge. The wireless and cigarettes were at her hand, and a row of bottles like policemen stood ready to pounce on her nerves, should they show unrest or disrespect. The great actress had tuberculosis and was being treated at home. The GP was charming and complaisant: "After all why not? Does it do a great deal of harm? Does not one heal better if happy?" But the specialist was a crude fellow, a barking prophet out of the Old Testament, the smell of camel was abundant and his words as from desert places: "You shall go to a sanatorium or you shall not live. For twelve moons you have lived pleasantly with a deadly serpent, but how shall a flabby frame withstand his onslaught? For if the mind which is the chief organ does not endure hardness in training, how can the lesser organs triumph? Salvation comes not to her who waits by the wayside, but she who strives shall come upon it. For the tears of discipline are the waters of healing, but she that eats honey all day shall not be saved."

When he had gone away she wept awhile and said: "Now I know why prophets live in the wilderness and why he that bears hard tidings must have private means."

The crash helmet of the military motor-cyclist reminds me of the most exciting bit of print in the *Lancet* for years—your annotation of Aug. 2, 1941, on the closest-up yet of the great-grandfather of all men, the spermatozoon, whose rimless bowler with a dent in it, streamlined and stark, makes him seem as unrelated to us as ever did photograph of bearded cricketer or whiskered military man. Bicycling into our little coast town to buy my fish I passed many of these motor-cyclists and pondered on these things: how the resemblance came from similar causes, minimising resistance in carrying the vital message, absorbing the shock of head-on encounter. Yea, verily, struggles of many kinds produce similar design. I find my mind much occupied nowadays with such fundamental thoughts, nor am I alone. To the fisherman from whom I buy my fish I once demonstrated, on the heaving thwart of his boat, how he could find the age of flatfish by counting the rings on the otoliths, and how by the breadth of the white rings he could tell which had been the good summers. As I was putting my terra-cotta-spotted plaice in my basket, he approached me earnestly: "Them little bones that tell the age, do we have——?" Visions of a pathologist in the post-mortem room flitted through my brain: "This man has obviously been through two wars; look at the long starvation periods, here and there; but this other fellow who is the same age shows continual growth, no rings at all, certainly a black-marketeer."

Going home there is a long hill, which with a vital capacity of 1800 (how right the taxation authorities are to estimate h.p. by cylinder capacity) I have to walk. But there are consolations, for the gardens on each side are blessed with birds, and just as war is making us ask serious questions so spring is forcing the blackbirds with one accord to sing. Near the top of the hill lives the Colonel, a devout hunting man, for whom some time ago I dissected out the os penis of a fox, which, I have an awful suspicion, he uses as a tooth-pick. He ambushed me just as I was hop-hopping on my bike. "Halt! I want to ask you. That little bone—— Do we——?"

MEDICINE AND THE LAW

A Doctor's Claim for Fees

A DISPUTE over liability for medical attendance is reported in the *Solicitors' Journal*, where county-court litigation of considerable interest is often recorded. A doctor attended two children. Their mother afterwards divorced the father and re-married. The doctor sued the original husband and wife, the parents of the patients. The wife said that the first husband ought to have paid her £2 a week under an agreement, but had in fact not paid her more than £50 in the four years since the divorce. She would have paid the doctor's fees if the payments had been regularly made under the agreement; as they had not, she was obliged to refuse to pay. The first husband had offered payment on conditions. The doctor rejected these conditions, having been told at the outset that this defendant was responsible for the amount. The Stratford-on-Avon county-court judge gave judgment against the first husband with costs including the costs payable to the wife, against whom the doctor's claim was dismissed.

Privilege for Hospital Records

The Court of Appeal, in Denton *v* Brooke, Conran, and Hove General Hospital, has decided a point of considerable importance to hospitals and medical men, on which there has been some difference of opinion—whether a patient is entitled to know the contents of the hospital records relating to his own case. In the United States, although the various states have legislation differing about the disclosure of documents of this character, H. H. Caldwell of the Chicago Bar has advised hospital administrators that the patient and his attending physician should have access to the hospital records "as a matter of right because of the fact that the physician largely contributed to the making of the record and because the facts there recorded are personal to the patient, or his legal representatives" (*Hospitals*, June, 1940, p. 63). C. E. A. Bedwell on the other hand, in a paper read before the Medico-Legal Society (*Med.-leg. Rev.* 1941, **9**, 14), observed: "It is argued with a certain amount of plausibility that he [the patient] should have access to the notes in order to

obtain independent advice when he considers that he has some grievance against the hospital or the medical man. But the notes are confidential documents made by the medical staff for their information. If this claim is conceded, an able advocate acting for a determined litigant may find cause for action in almost any record compiled by medical men without any thought of litigation. In one case the patient's claim was conceded; such use was made of the material that the hospital committee were frightened into paying a substantial sum in order to avoid being brought to court, although it was very doubtful whether any action could have been sustained against them." The Court of Appeal have upheld this view in the case where a decision has been given on the point for the first time. A patient named Denton is bringing an action for negligence against a surgeon on the staff of the Hove General Hospital, his house-surgeon and the committee of management in connexion with an operation to his knee after an accident. A septic condition developed and he was transferred to the Municipal Hospital, when the medical superintendent called into consultation the surgeon from the voluntary hospital who had performed the operation. The leg was amputated on April 7, 1939, and four days later the surgeon wrote a report which he sent with a covering letter to the secretary of Hove General Hospital. In June, 1940, the patient issued the writ in his action when the existence of this report became known and his solicitors applied for disclosure of the documents. The hospital claimed privilege on the ground that they were documents passing between the committee of management, their solicitors and proposed witnesses for the defence to the patient's action. The matter came before a master who made an order for the documents to be produced and inspected, but on appeal Hallett J. set aside the order. The patient appealed and without calling on counsel for the hospital the Court of Appeal (MacKinnon, Luxmore and Du Parcq, L.JJ.) dismissed the appeal. MacKinnon, L.J., said that the court had looked at the documents in question and were satisfied that they were documents as to which privilege could properly be claimed and according to the recognised rules of procedure the defendants were entitled to decline to consent to their inspection.

Right Bottle and Wrong Contents

A recent case at the Yorkshire assizes (Cowie *v.* Holderness) raised the question whether a medical practitioner is negligent if he omits to satisfy himself as to the contents of a bottle handed to him by a trained nurse. The defendant doctor had examined a schoolboy before his evacuation to Canada. In 1938 a polypus had been removed from the boy's left ear to cure the deafness from which he suffered. The doctor, it was said, when examining him in 1940, saw some wax in the ear and poured into it a few drops of what he thought was hydrogen peroxide from a bottle, labelled as such, handed to him by one of the county council's trained nurses. Unfortunately the bottle contained turpentine. It was alleged on behalf of the plaintiff that the result was the serious perforation of the ear drum and almost complete deafness in that ear, as well as pain and a general loss of health. Apparently nobody explained the presence of the turpentine in the bottle.

The judge observed that, on the issue of negligence, the only medical evidence adduced for the plaintiff was that of Mr. E. W. Bain, consulting aural surgeon of Leeds. The following question was put to this witness in cross-examination: "A trained nurse having been asked for hydrogen peroxide, and having handed to the doctor a bottle so labelled, would you expect the doctor to ascertain what the contents were?" Mr. Bain's reply was "No." He agreed that turpentine would be equally colourless and would not be detected except by the smell. Accepting this evidence, the judge held that the doctor was not negligent if he omitted to smell a bottle which appeared to contain the correct medicine, handed to him by a trained nurse from a box of medical stores. Although naturally everyone must sympathise with the plaintiff, judgment must be for the defendant doctor.

Austrian Doctor's Change of Name

Dr. Pinchas Mayersohn, an Austrian doctor registered here in that name with the police, was sentenced lately to one month's imprisonment at the Marylebone police-court for having used a name other than that by which he was ordinarily known immediately before the date when Regulation 20 of the Defence Regulations came into force. This Regulation alters the language of section 7 of the Aliens Restriction (Amendment) Act, 1919. The accused was recently acquitted at the Central Criminal Court on a charge of performing an illegal operation on a woman at a Belsize Park nursing-home. He had used the name of Dr. Fischer. According to a police witness Dr. Mayersohn held the degree of doctor of medicine of Vienna University and had practised in Vienna till April, 1939, when he came to Britain to escape from Nazi oppression. One of the conditions of his landing permit was that he should not practise privately in Britain until his name was entered on the Register. He had, said the magistrate, taken another name and performed an operation. The sentence of the court took into account the fact that he had been in custody on remand for 33 days.

PALESTINE

POPULATION CHANGES

FIGURES from the government statistical department show that in the third quarter of 1941 the Jewish population increased by 1000 and the Mohammedan by 4500, while the Christian section diminished by 225. On Sept. 30, 1941, the whole population of Palestine was 1,574,000, of whom 472,500 were Jews. The Jewish birth-rate during the quarter was 18·9 per 1000, the death-rate 7·3.

DRUG SUPPLIES

Last year insulin became so scarce that many diabetics could not obtain it and suffered in health in consequence. A communal kitchen was set up to meet their dietary needs and this proved very successful. The shortage of insulin is now less acute; there is enough for all serious cases, and those who can produce a doctor's certificate are now able to buy insulin at moderate prices.

During the first two years of the war the supply of medical drugs was well maintained by an American women's association, which sent supplies regularly to the Jewish University through the Hadassah Hospital. This enabled the university not only to maintain its own stocks but to provide necessities for other medical institutions. Since the outbreak of war in the Pacific, however, these supplies have necessarily ceased, and the hospitals are having to rely on their modest stocks and to use them with great economy.

MEDICAL RETROSPECT

The Jewish Medical Association in Palestine was founded thirty years ago. A meeting in honour of this anniversary was recently held, attended by those surviving members who helped to found it.

NEW SURGICAL AND DENTAL DEPARTMENTS

On Jan. 1, 1942, a new department of brain-surgery was opened at the Jewish University Hospital at Jerusalem, under the direction of an American surgeon. A small department of wound-healing has also been opened. On Jan. 11 a new dental service was established at the hospital, to provide dental care for urgent cases, and necessary treatment for patients with a dental focus of sepsis, and those requiring dental care before or after operations.

SHORTAGE OF HOSPITAL BEDS

At Tel-Aviv the Hadassah Hospital has only 300 beds, though serving a population of 250,000. During 1941, 556 urgent and 424 less urgent cases were received; but the beds were too few for the admission of patients needing lengthy observation or investigation. The obstetric ward is too small to admit all those applying; 119 women had to be refused beds during the year, and as they came from among the poorest of the Jewish population this meant that their children would have a bad start in life. The shortage of beds has sometimes been so acute that patients in urgent need have had to be turned away. The situation in the government hospital at Jaffa is much the same, and they are sometimes obliged to send infectious cases on to the Hadassah Hospital, although the responsibility for such patients properly devolves on the government hospital.

Letters to the Editor

AIR BLOCK IN LUNG BLAST?

SIR,—In your annotation of Feb. 14, 1942 (p. 206), you referred to a serious condition in the newborn infant described by Gumbiner and Cutler [1] and termed "air block" by one of us (C. C. M.[2]) Air in the anterior mediastinum was demonstrated by X ray and removed by a hollow needle. We feel that air block may occur in the human subject at any age and in a wide variety of clinical conditions, and that it is usually unrecognised. It has been produced experimentally in animals.[3] Evidence of air in the interstitial tissues of the lungs and mediastinum has been found in an infant [4] and a young child,[5] both of whom died of air block. The underlying pathological conditions and clinical manifestations have been described.[6 7]

Air block originates from air which has leaked into the connective tissue of the lung from alveoli in which the pressure is unduly high or which have been overinflated. The specific parts of the alveoli where this leakage occurs are the bases which rest on connective tissue, and particularly those which encircle the sheaths of the finer branches of the pulmonary blood-vessels. The invading air accumulates as bubbles in the vascular sheaths and presses on the arteries and veins, so embarrassing the pulmonary circulation. These bubbles travel down through the connective tissue, particularly that of the vascular sheaths, to the hilus, growing in size, and incommoding larger and larger parts of the pulmonary vascular system. This interstitial emphysema interferes not only with the pulmonary blood flow but also with the normal inflation and deflation of the lungs, which are as it were splinted, and cannot be reduced to the size of deflation. Thus they appear over large when removed from the thorax.

With continued leakage, air escapes through the lung root into the mediastinum, where it accumulates, and so cuts down the efficiency of the cardiac and vascular functions. It may cause pain like that of angina. It tends to work forward between the pericardium and pleura and to accumulate under the sternum, blanketing the heart sounds and contributing its own loud grating noise, most striking in systole. Here it is disclosed by lateral radiograms. From the mediastinum it may dissect its way upward into the root of the neck, and even into the axillæ and beyond; or downward into the retroperitoneum; or laterally into the opposite lung; or it may rupture into the pleural cavity, producing pneumothorax.

On reading the accounts of "lung blast" [8] we are led strongly to suspect that air block has arisen from the greatly altered pneumodynamic and hæmodynamic conditions. The most outstanding feature which suggests this is the fixation of the chest in a position of almost maximal inspiration with but little tidal movement of air. Indeed this condition might be forecast from experimental work.[3] The dyspnœa, cyanosis and retrosternal pain also strongly suggest air block. The rigid abdomen, too, with no lesion to explain the rigidity when laparotomy is performed, and the presence of pneumothorax in some of the patients, also fit perfectly into the picture of air block. The pathological findings of hæmothorax in some patients, and of blood in the mediastinum and along the sheaths of the carotids, with no visible rupture of any vessels to explain the source of the bleeding, are again what one would expect in severe air block.

Although X-ray examinations have been made, we feel that the lateral or oblique projections may best reveal the presence of air in the mediastinum, in spite of accumulated blood, which beclouds the picture not infrequently. We should suggest that these cases be studied very carefully by all good methods for the presence of air block. Zuckerman's [9] figures 9, 11 and 15 are interpreted by us as showing air block in experimental animals.

Particularly we would urge that, when discovered, efforts at removal of the air be tried without delay. Although it is common knowledge that a considerable amount of air may be absorbed from the connective tissues if the patient lives long enough, we feel that it is always a danger in the lungs and mediastinum, and may cause death. Removal from the anterior mediastinum may be accomplished by Gumbiner's [1] method of tapping the pocket with a needle; or from the posterior mediastinum through a small incision in the root of the neck,[4] into which is insinuated a tube, such as a gum elastic catheter. Fluid blood or serum may also be thus removed, to the advantage of the patient.

It is hoped that those responsible for the care of lung-blast victims will promptly examine them for air block, and will give these suggestions for relief a fair trial.

University of Western Ontario, London, Canada. CHARLES C. MACKLIN, MADGE T. MACKLIN.

1. Gumbiner, B. and Cutler, M. M. *J. Amer. med. Ass.* 1941, **117**, 2053.—2. Macklin, C. C. *Trans. roy. Soc. Can.* Sect. 5, 1940, 69.—3. Macklin, *Canad. med. Ass. J.* 1937, **36**, 414.—4. Fisher, J. H. *Ibid*, 1941, **44**, 27.—5. Fisher and Macklin. *Amer. J. Dis. Child*, 1940, **60**, 102. 6. Macklin. *Arch. intern. Med.* 1939, **64**, 913.—7. Macklin. *Med. Rec.* 1939, **150**, 5; *J. Mich. med. Soc.* 1940, **39**, 756.—8. O'Reilly, J. N. and Gloyne, S. R. *Lancet*, 1941, ii, 423.—Dean, D. M., Thomas, A. R. and Allison, R. S. *Ibid*, 1940, ii, 224.—9. Zuckerman, S. *Ibid*, 1940, ii, 219.

NICOTINIC ACID IN CEREBRAL THROMBOSIS

SIR,—I would like to record a new therapeutic application of nicotinic acid, which I think we in Lisbon have been the first to try. The vitamin properties of nicotinic acid have been known since 1937, its antipellagrous effect being identical with that of its amide and of quinine nicotinate, and apparently linked with the pyridine radicle. Its vasodilating action, demonstrated by several workers, is evidently independent of its properties as a vitamin, since its amide has no vasodilator effect. W. B. Bean and T. D. Spies, and D. I. Abramson and his colleagues have shown that the vasodilatation occurs in the skin and skeletal muscles, with no associated rise in blood-pressure, and argue that it is thus a purely peripheral phenomenon. M. T. Moore has demonstrated dilatation of the vessels of the pia mater in the cat, and a rise of cerebrospinal pressure in man, after the administration of nicotinic acid; and C. D. Aring and his colleagues found that intravenous nicotinic acid produced an increase in the cerebral circulation, beginning shortly after the injection and accompanied by intense cerebral congestion over a period of 15–60 min. I have confirmed the cerebral vasodilator action of nicotinic acid, and have recently shown that though the cerebrospinal fluid pressure and the temperature of the skin of the face both rise moderately, the arterial pressure, the retinal pressure and the respiration-rate remain the same. I therefore thought it would be worth trying nicotinic acid in cases of cerebral softening following thrombosis. We have given it intravenously in doses of 5–10 mg. to cases of cerebral thrombosis and embolism. The treatment is harmless; it has no effect in cases where the damage is due to a large embolus, but in some cases of thrombosis it has been very successful. At present we have 3 cases showing complete or almost complete regression of symptoms of a recent hemiplegia within a few hours of the injection of nicotinic acid. This cerebral vasodilator is superior to any others so far studied, and seems to have no harmful effects, even in cases with arteriosclerosis.

Faculté de Médecine, Lisbon. DIOGO FURTADO.

DOUBTS ON VITAMIN K FOR THE NEWBORN

SIR,—The following facts have been established by the numerous investigations made in recent years on the blood of newborn babies.

(1) In comparison with normal adults, many newborn babies (normal and abnormal) have a deficiency of prothrombin during the first week of life, and especially on the 2nd and 3rd days. They seem, therefore, to be in danger of bleeding.

(2) The prothrombin level can be raised fairly quickly by giving vitamin K or one of its synthetic analogues to the newborn baby.

(3) If the pregnant woman is given vitamin K or one of its analogues in adequate dosage the prothrombin level of her child's blood is higher than that of babies whose mothers have not been so treated.

We should not, however, forget the difficulties which stand in the way of accepting prothrombin deficiency as the sole cause of hæmorrhagic disease of the newborn. Babies may show well-marked deficiency of prothrombin without bleeding (Dam et al. *Lancet*, 1939, ii, 1157;

Snelling and Nelson, *J. Pediat.* 1940, 17, 615; and a number of other workers). Moreover, though prothrombin deficiency is common hæmorrhagic disease of the newborn is uncommon. I find myself, therefore, in agreement with Snelling and Nelson (loc. cit.) when they say "there is some additional factor with low prothrombin of the blood causing hæmorrhagic disease of the newborn infant."

Notwithstanding these theoretical difficulties, I consider that the treatment of hæmorrhagic disease of the newborn should be to give both vitamin K and blood-transfusions. I am still not sure whether transfusions have any specific action in controlling the hæmorrhage, but they undoubtedly save lives (Capon, *Lancet*, 1937, i, 431) and in less severe cases they are of much assistance in restoring health. I have not yet had sufficient experience of vitamin K to enable me to assess its value critically.

In expressing these opinions I must make it clear that for me the diagnosis "hæmorrhagic disease of the newborn" signifies a condition in which spontaneous hæmorrhage occurs usually within two to four days of birth, without any apparent cause such as birth-trauma, sepsis, syphilis, &c.; and it is important to maintain a strict definition which is based primarily on clinical experience. The complexities of a difficult question have been increased by those workers who have wished to enlarge the scope of this syndrome in order that it may include all examples of bleeding at this age-period. The paper by Sanford and others, which forms the subject of your annotation of April 18, is a welcome support to the opposition against this artificial and unjustifiable stretching of terminology. You are rightly careful to refer to the bleedings as "hæmorrhagic manifestations" and not as "hæmorrhages in babies suffering from hæmorrhagic disease of the newborn," though you do not expressly state, in the words of Sanford and his colleagues, "we do not believe that these hæmorrhagic manifestations are the same thing as true hæmorrhagic disease of the newborn." They make it clear, in fact, that not one of the infants in their series could be regarded as an example of hæmorrhagic disease of the newborn, and we should be grateful to them and to your annotation for stressing the importance of maintaining a strictly critical attitude.

Liverpool. NORMAN B. CAPON.

MEDICAL ASPECTS OF BOXING

SIR,—The discussion in the *Lancet* a few months ago of the medical aspects of boxing revealed a considerable diversity of opinion. I therefore feel it is desirable to place additional evidence on record as it becomes available.

On Feb. 4, 1942, a young healthy soldier participated in a boxing match which was held under the supervision of the appropriate sporting authorities. All the required conditions were fully observed. Both fighters belonged to the same weight class; both were well-trained; the ring was in the prescribed state; a good referee was available; gloves of amateur size were used; and both men were seconded by experienced helpers. During the second round of the fight this soldier received a blow on the jaw. Although he did not fall on the floor he was, from that moment onward, completely dazed and counted out on his feet. Ten minutes after the fight he received medical attention. At that time he was disorientated, complaining of a severe headache. Ten minutes later he was semiconscious. It was noted that his left pupil was dilated and did not react to light. He was removed by ambulance to hospital where he arrived completely unconscious. There was Cheyne-Stokes breathing, a slow pulse and a temperature of 100° F. Both pupils were now dilated and did not react to light. Babinski's sign was positive on both sides. Barring a slight bruise at the outer angle of the left eye there was no visible evidence of injury. Lumbar puncture showed blood-stained cerebrospinal fluid which, however, did not escape under increased pressure. Middle meningeal hæmorrhage was diagnosed and an operation was immediately performed. As the patient was deeply unconscious no anæsthetic was administered. A circular bone flap was raised over the left temporal area. The dura was now found to be under considerable tension. On incision much fresh blood escaped and an underlying laceration of the brain was seen. At this stage the patient stopped breathing, and in spite of attempts of resuscitation he died shortly afterwards. Post-mortem examination showed laceration of left temporal lobe and extensive intracranial hæmorrhage. There was no evidence of a fractured skull.

No-one can deny that the blow to the chin which caused the fatal injury was delivered in accordance with the accepted rules of boxing. It should especially be noted that the deceased did not fall and injure his head on the floor. With regard to the mechanism of the injury I refer to p. 137 of my book, "The Medical Aspect of Boxing" (Pretoria: van Schaik. 1941). I might perhaps repeat that every blow to the head leads to a momentary elastic deformation of the skull. This deformation may easily lacerate brain tissue as well as overstretch and rupture intracranial blood-vessels, as in the present instance in which the blow produced a parenchymatous injury and a subdural hæmorrhage without fracturing the skull.

Johannesburg. E. JOKL.

THE *DIPLOCOCCUS RHEUMATICUS*

SIR,—It has seemed to us that observers of the calibre of Poynton and Paine could hardly have been entirely mistaken, when, as the result of long and careful experimental work, they announced their belief that acute rheumatism was the result of an infection with the *Diplococcus rheumaticus*. As, however, their work was not generally confirmed by other workers, medical opinion has subsequently tended to the belief that this organism must have been a contaminant. As the result of experience gained by us during the last two years, an alternative solution is now suggested for some of their cases.

It was pointed out two years ago (Stott, A. W. and Copeman, W. S. C. *Lancet*, 1940, i, 1116) that meningococcal infection of the blood-stream (without meningeal symptoms) is, contrary to general belief, not uncommon, but that it is misdiagnosed in the majority of cases as "acute rheumatism"; and this has been our experience here. We suggest that some of the cases in which Poynton and Paine found this diplococcus may have been cases of meningococcal septicæmia, a condition which was not at that time generally recognised. This form of "rheumatism," as is now known, can only be differentiated from rheumatic fever with certainty by means of blood-culture (often several) with perhaps the assistance of agglutination reactions. The rash which generally occurs on the legs and upper arms is often sparse, and as it is generally non-irritant may pass unnoticed by the patient, or may be considered to be due to salicylates. If it is profuse it may become confluent and present the picture of typical erythema nodosum (which was present in some of their cases), while joint and muscle pains, headaches and sweating are equally features of the meningococcal and of the classical type of rheumatism.

In some of these cases of meningococcal infection of the blood-stream the meninges will ultimately become involved (Dickson, R. C. et al. *Lancet*, 1941, ii, 631) and the resulting meningitis then runs its normal course. This appears to us to be the probable explanation of the following case quoted by Poynton and Paine (Researches on Rheumatism, London, 1913, p. 240).

A boy of 13 years was admitted to University College Hospital suffering from arthritis of knees and ankles and pain across the chest. The boy's father had had rheumatic fever and the condition on admission appeared to be ordinary rheumatic fever also. Rest and salicylates reduced the temperature, and 3 weeks uneventful convalescence (still on salicylates) followed, but this culminated in headache, vomiting and coma followed in 2 days by death. At the post-mortem examination no changes were found in the affected joints, the mitral valve showed a healing lesion, and the brain showed basal meningitis with turbid fluid over the whole base, and general spinal meningitis. The films showed diplococci in numbers.

Poynton and Paine were inclined to believe that this was a case of true rheumatic meningitis. We suggest, however, that the diplococci in the pia, shown in the microphotograph accompanying the case-report, are not unlike meningococci. Again (p. 128, loc. cit.), they state that diplococci were isolated by them in one case from the lateral ventricle in pure culture, while in a fatal case of "chorea," in which movements were severe and

the heart little affected, numerous diplococci were found in the perivascular spaces of the pia mater. As they point out it seems probable that there is a clear association between "rheumatic" chorea of this type and the occurrence of diplococci in the brain and its membranes.

The *Diplococcus rheumaticus* was not invariably present in their rheumatic cases, nor did they claim that this was the only cause of the disease. They produce some evidence to show that these rheumatic fever cases may be in certain conditions both infective and infectious—almost epidemic. They cite cases where more than one member of a family was affected with acute rheumatic fever at the same time—e.g., two children sleeping in the same bed. The accurately recorded case-histories of many of the cases detailed in which diplococci were found are not inconsistent in any way with those observed by us in cases in which we have recovered the meningococcus from the blood-stream. We suggest, therefore, that the diplococcus isolated from their cases may in fact have been a meningococcus.

The diplococcus described by Poynton and Paine (loc. cit.) was difficult to grow, and often refused to grow on a medium unless blood or serum were added to it. It was easily stained by the aniline dyes, but did not retain Gram's stain with great tenacity. Degenerate forms were common—it became swollen and pear-shaped. In bouillon there was turbidity with slight flocculent deposit in 24 hours, with distinct deposit in 3 days. The medium became acid. On blood agar (one of the best media) minute colonies were visible in 24 hours which tended to remain discrete and to turn the blood pigment a rusty-brown. On this medium the diplococcus would live for long periods—this latter characteristic appearing to point against the identity of the diplococcus with a meningococcus.

It seems to us from a study of the full evidence that they were in their cases in all probability dealing with two types of organisms—a gram-negative diplococcus, and an organism which took on the appearance of a streptococcus on culture. It is with the former organism that the remarks in this letter are concerned.

To summarise, we suggest that in some at least of the cases recorded by Poynton and Paine of acute rheumatic fever in which the *Diplococcus rheumaticus* was found the symptoms and course were identical with those cases which have more recently been shown to be due to a meningococcal infection of the blood-stream without meningeal involvement, and that the diplococcus may therefore be a form of meningococcus.

W. S. C. COPEMAN,
W. STEWART.

MIDDLE MENINGEAL HÆMORRHAGE WITHOUT FRACTURE

SIR,—The paper in the *Lancet* of May 2 (p. 532) by Mr. Falconer and Dr. Schiller on traumatic hæmorrhage from the middle meningeal artery without fracture of the skull is of particular interest to us because we have had an instance only this week.

A boy aged 15 was hit on the right side of the forehead by a blunt stone (said to be "about the size of a sixpence") catapulted from a distance of 30 yd. He walked home unaided with an increasing headache and proceeded to vomit and cry. He was admitted to hospital under Mr. G. H. Marshall (to whom we are indebted for permission to publish this case) just two hours after the accident. He was seen by one of us (D. C. L.), and was found to be pale, shocked and stuporose. He was unable to answer questions but responded freely to stimuli. The pupils were equal in size but only the left reacted. Signs of cerebral irritation developed rapidly, the head being deviated to the right. Within an hour the pupils were both immobile, the right grossly dilated, the left contracted. Bilateral convulsions were taking place, more severe on the right side. With his right hand he made vigorous scratching movements of his head, abdomen and genitalia. Abdominal reflexes were absent. There was extensor plantar response and ankle-clonus on the left side. A diagnosis of extradural hæmorrhage was made but deterioration was too rapid to permit of operative intervention. The boy died four hours after the accident.

At autopsy there was found to be a small abrasion of the skin, about 1 cm. in diameter, some 6 cm. above the zygoma and 3 cm. behind the external angular process. There was bruising of the underlying frontalis muscle but no sign of a fracture. A massive soft blood-clot was found extradurally displacing the right frontal lobe mesially and posteriorly, having spread round over the frontal pole. The source of bleeding was the anterior branch of the right middle meningeal artery. The surface of the brain, more particularly of the right hemisphere, was swollen, the sulci being flattened out. The white matter underlying the right frontal cortex showed numerous petechial hæmorrhages, but there was no bleeding in the pons.

Probably, as Falconer and Schiller contend, the occurrence of traumatic rupture of the middle meningeal vessels in the absence of fracture of the skull is not yet sufficiently recognised. The word "vessels" is used instead of artery because Wood Jones suggests that the delicate venæ comites are more likely to be torn than the artery (quoted by Hamilton Bailey in Emergency Surgery, Bristol, 1938, p. 488). A suggestion as to the mechanism of rupture is given by both Gray (Anatomy, London, 22nd ed. 1923, p. 618) and Rose and Carless (Manual of Surgery, London, 1937, p. 878), who state that the artery may be ruptured by a blow on the head sufficiently severe to detach the dura mater but without causing injury to the bone, the artery being carried with the displaced membrane. If this theory is correct, one would expect this condition to be fairly common in war-time, and it would be interesting to know if it occurred as the result of blast. The possibility of an undue friability of the vessel walls, or, more likely, an inherent defective structure of the arteries at bifurcation analogous to that found in congenital aneurysms of the cerebral vessels should not be overlooked. In our case the source of bleeding was posterior to the surface wound, and this suggests that the blow was transmitted; it seems more likely that the initial lesion was a slight separation of the dura mater with tearing of the artery, and that this separation was increased by the pumping action of the artery. Sir Charles Bell's astonishment at the ability of the severed artery to tear off the dura mater from the overlying bone was echoed by us in the post-mortem room, but we concluded that this feat would be rendered more difficult with advancing years owing to the increasing fixity of the membrane to the bone, while the likelihood of a fracture of bone, on the other hand, would increase. Is extradural hæmorrhage without fracture in point of fact more frequent in the young?

D. C. LITTLE,
Worcester Royal Infirmary. W. H. MCMENEMEY.

SIR,—The death of one of Montaigne's brothers, to which Mr. Max Page refers, reminds one of the death of King Charles VIII of France, in 1498, at the age of 27¾ years. It seems that in running through the passages of the Castle of Amboise to join a hunting party, which was waiting for him, he hit his head against the sloping side. Nevertheless he took part in the hunt, but gradually ingravescent coma came on, from which he died. Montaigne, in the chapter referred to, does not mention this, though he alludes to the "recent death" of a King of France, evidently Henry II, who died in 1559 from the result of a wound received at a tournament.

Harley Street, W.1. F. PARKES WEBER.

MOVEMENT OF FOREIGN BODIES IN THE TISSUES

SIR,—In response to Prof. Lambert Rogers's appeal in your issue of March 28 I should like to record a case I saw about a year ago of a needle travelling in the tissues. A child aged eighteen months had been bumped on the floor by an elder brother and a needle had entered his left gluteal region. X rays showed the needle to be lying about one inch above the greater trochanter, behind the acetabulum, and the wound of entry confirmed this. The following day I explored the buttock and after an hour's fruitless search I abandoned the operation. About six days later I was called to the children's ward and the needle was seen to be lying in the muscles of the anterior abdominal wall, roughly in the position of McBurney's point but on the left side. The needle was swinging in the muscles on respiration and was easily removed under a local anæsthetic, when an uneventful recovery took place. I can only suggest that the vigorous muscular movements in a child and the exertions of crying caused the needle to traverse the muscle bellies.

JOHN GORDON.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M.P.

THE death of Pat Munro, M.P. for Llandaff, while on duty is the first Home Guard casualty at Westminster. Munro, a keen man of 59 years, was employed as a runner between battalion and company H.Q. of the Palace of Westminster Home Guard and felt it his duty to run. Sir Robert Tasker, who was doing the same duty, tells me that Munro did not look quite fit but would not take things easily. The work involved a period of duty all night, followed by a strenuous period of sudden activity in the early morning—and collapse. Munro had been a great athlete in younger days, and Home Guard veterans should remember the need of training to withstand periods of strain followed by sudden exertion—the inevitable condition of Home Guard Active Service.

* * *

Parliamentary business has ranged this week from the fixing of the prices of second-hand goods to fuel rationing and, in the House of Lords, a survey of projects for large-scale reorganisation of the Colonial Empire. After an interlude in which the House, after a somewhat uneasy discussion, decided to refer the conduct of a member to the Committee of Privileges, the Prime Minister came in unexpectedly and announced the capture of the naval base of Diego Suarez in Madagascar. This cheered the House and helped to get the debate on fuel rationing which followed into its proper perspective. The significance of fuel rationing—coal, coke, gas and electricity—is that it is the rationing of a home-produced commodity which is one of our chief exports. It is in fact a rationing of labour as well as material. Of labour because we cannot take the equivalent of two divisions of miners back from the Services at a time when the day of a British offensive draws nearer; and of material because we may need more coal for Russia and other parts of the world-front of the Democracies. Well done fuel rationing should provide adequately for the majority of consumers and give them a fair share all round while restricting waste. Parliament hopes rationing of fuel will be well done and there will be further critical examination of the Government's scheme. An important point to keep in mind is that fuel rationing must not be allowed to interfere with the recognised standards of public cleanliness necessary for health—nor with laundry facilities already restricted by delivery and collection difficulties and by withdrawals of man-power and of women-power. We may need a hygiene campaign with the slogan "Take more cold baths" and a return by those accustomed to luxury plumbing and constant hot water to the Saturday bath night.

* * *

Cheerfulness keeps breaking through in communiques of land, sea and air battles despite the grave danger in the East and the serious shipping position, for there is a breath of "attack" ozone in the air. And scientific thought and experience keeps breaking through despite Civil Service and Army Service prejudice. In answer to a question by Mr. Ellis Smith, a Labour M.P. especially interested in engineering, the Secretary of State for War said he was "fully aware of the importance of applying modern scientific knowledge to the solution of military problems" and announced his decision to appoint a scientific adviser to the Army Council. The appointment of "officers with the necessary scientific and technical experience to General and Formation Headquarters in theatres of war" is also to be extended. In view of this perhaps the blank space in the General-Staff plan published by the Government recently will be filled up. The officers of the General Staff are many as set out in this plan. But not one of them is specifically a scientific expert on the mechanical side of war. And not one of them is a scientific expert of the medical service concerned with getting the best out of the soldier in body and mind. No doubt scientific advisers are "attached," but they should be included in the original and first consultations.

All these questions were to have been discussed by the House before Whitsuntide. There is to be a two-day debate on the war, but it will probably only touch on these matters and be more concerned with trying to dig out information as to responsibility for our defects in Malaya and the East. The larger scientific discussion on General-Staff problems will not come on until later. But behind the scenes discussion is continuing.

QUESTION TIME

Nursing Cadet Corps

Sir FRANCIS FREMANTLE asked the President of the Board of Education if his attention had been drawn to the proposal of the Hertfordshire education authority for the institution of a nursing cadet corps to fill the gap between school and professional nursing; and whether, in consultation with the General Nursing Council and the Minister of Health, he would give it his most favourable consideration.—Mr. R. A. BUTLER replied: My attention has been called to these proposals, and if they are formally submitted they will receive careful consideration. In so far as they are intended to provide a preparation for hospital nursing, they would have to follow the principles agreed with the General Nursing Council.

Sir F. FREMANTLE: Does the Minister recognise that this proposal is not only for hospital nursing, but also for hospital nursing and general education for maternity nursing for those girls who like to choose it?—Mr. BUTLER: Yes.—Mr. K. LINDSAY: In view of the shortage of organisations into which girls of 16–18 can be directed does the Minister consider that this excellent experiment in Hertfordshire should be encouraged in other counties, in view of the shortage of nurses? No further reply was given.

Extra Fuel for the Sick

Mr. I. C. HANNAH asked the President of the Board of Trade whether it was proposed to make any extra ration of fuel available for the sick, especially workers temporarily disabled by rheumatism or bronchitis.—Mr. E. DALTON replied: Special provision will certainly be necessary in the case of sickness.

Deaths from Tuberculosis

Replying to questions the Minister of Health gave the number of deaths in England and Wales from tuberculosis as follows:—

ENGLAND AND WALES

—		1938	1939	1940	1941 (Provisional)
Respiratory tuberculosis	Males	12,445	12,702	13,920	13,986
	Females	8837	8840	9740	9648
Other forms of tuberculosis (including tub. meningitis)	Males	2261	2229	2381	2652
	Females	1996	1852	2103	2384
Tuberculous meningitis	Males	918	868	957	1196
	Females	873	816	929	1170

Mr. T. JOHNSTON also gave the following figures for Scotland:—

Year	Respiratory tuberculosis			Tuberculous meningitis			Other forms of tuberculosis		
	M.	F.	Total	M.	F.	Total	M.	F.	Total
1938	1396	1185	2581	198	192	390	237	224	461
1939	1506	1211	2717	193	184	377	218	214	432
1940	1669	1368	3037	242	243	485	244	237	481
1941	1645	1472	3117	267*	300*	567*	249*	242*	491*

* These figures are provisional. M, male; F, female.

Recruitment of T.O.s

Mr. GLENVIL HALL asked the Minister of Health how many full-time tuberculosis officers had been taken into the Armed Forces from London, the rest of England and Wales, respectively; and if he was satisfied that where such officer had been taken from civilian work suitable alternative arrangements had been made.—Mr. BROWN replied: One full-time tuberculosis officer in London, and nine in the rest of England and Wales, have been recruited for the medical branches of H.M. Forces on the recommendation of the Central Medical War Committee. In each instance I was advised that suitable alternative arrangements could be made by the employing authorities, and in five of the cases, the one in London and

four elsewhere, recruitment was delayed for varying periods for this purpose.

Deaths from the Common Fevers

In answer to a question Mr. BROWN gave the number of deaths from diphtheria, measles and whooping-cough recorded in England and Wales during the last three years as follows:—

Year	—	Males	Females	Total
1939	Diphtheria	1128	1049	2177
	Measles	159	150	309
	Whooping-cough	566	707	1273
1940	Diphtheria	1254	1225	2479
	Measles	425	432	857
	Whooping-cough	326	352	678
1941	Diphtheria	1332	1309	2641
	Measles	635	510	1145
	Whooping-cough	1013	1370	2383

Mr. JOHNSTON, replying to a further question, said that during 1941 in Scotland there were 996 cases of diphtheria among immunised children of which 1 was fatal and about 7000 among non-immunised children of which 418 were fatal. Children were included in the immunised group if they had a full course of inoculation, although complete immunisation does not develop until three months after the last inoculation. Children who had only a single inoculation were not included in the immunised group.

Admission to Medical Services

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health, in view of the fact that hitherto admission to the medical register had qualified persons so admitted to offer themselves for appointments in the Armed Forces and to undertake civil practice, by what authority the Central Medical War Committee was now imposing further requirements, involving a further six months of hospital work after registration as an indispensable condition of admission to the services or to civil practice; and whether he would inquire into the matter.—Mr. BROWN replied: The arrangement under which a period of hospital work after qualification is required before admission to the medical branches of H.M. Forces was made at the request of the Service departments and has been in operation since the early days of the war. Concurrently with this arrangement, all newly qualified practitioners are encouraged by the CMWC to take hospital appointments instead of going into private practice, and if they fail without reasonable cause to take such an appointment they are liable to be directed to do so by the Minister of Labour under Defence Regulation 58A.

Qualified Chemists in RAF

Mr. G. H. OLIVER asked the Secretary of State for Air what steps were being taken to use the professional skill of qualified chemists now in the service as dispensers in the Royal Air Force; and whether he was aware that this important work in a large number of cases was performed by unqualified persons with little or no experience of pharmacy.—Sir ARCHIBALD SINCLAIR replied: The requirements of the Royal Air Force are already adequately met by the employment of qualified chemists in posts where this is justified by the volume and complexity of dispensing work.

Restrictions on Use of Red Cross

Sir RALPH GLYN asked the Home Secretary whether any decision had been reached regarding civil-defence ambulances wearing the Geneva Red Cross in common with service ambulances; and whether the position of personnel had been considered in the event of invasion unless the vehicles they served bore the conventional sign.—Mr. H. MORRISON replied: The use of the Red-Cross emblem is governed by the Geneva Red Cross Convention, to which this country is a party. By the terms of that Convention the Red-Cross emblem may only be used to protect or to indicate the medical services of the Armed Forces and the personnel and material of the voluntary aid societies which are authorised to assist them. Civil-defence ambulances bear clear markings, though not the Red-Cross emblem.

Supply of Drugs

Sir HERBERT WILLIAMS asked the Minister of Health what representations were made to him, on Oct. 14, 1941, by the Pharmaceutical Society in respect of the adequacy of the supply of drugs to hospitals, doctors and chemists; and whether he was aware that this adequate supply was being prejudiced by the distribution of pre-packed drugs by chain stores.—Mr. BROWN replied: I received a letter from the Pharmaceutical Society, dated Oct. 14, 1941, urging that as and when shortages of medical substances occurred, steps should be taken to ensure that these substances are first supplied to those wholesalers and manufacturers the bulk of whose business lies in supplying pharmacists in retail business, hospitals and doctors. I am not prepared to admit the implication in the last part of the question, but I am carefully considering in consultation with the Minister of Supply the question of further restricting the supply of essential drugs to essential medical purposes.

Animal Medicines

Mr. J. H. WOOTTON-DAVIES asked the Minister of Agriculture whether, in view of the limited amount of raw materials available, he would take steps to enforce by regulation that all packages and containers of animal medicines should give an indication of the composition of the contents, as in the case of proprietary medicines for human consumption, in order that farmers could be certain that they were suitable and necessary for the purpose.—Mr. R. S. HUDSON replied: I have no powers under existing legislation to impose a requirement of the kind suggested. Nor have I any reason to suppose that it would achieve the purpose indicated in the last part of the question.

Housing in African Colonies

Mr. H. MACMILLAN, replying to Major A. M. LYONS, said neither the Minister nor colonial governments are satisfied with all of the housing provided for government employees in the African dependencies, but in present war conditions it is not practicable to make all the progress which might be desired. Nevertheless, in various places steps are being taken to deal with the matter. As the most recent example I may mention an application from Nigeria for a grant from the Colonial Development and Welfare Vote to enable an extensive housing scheme to be carried out at the Enugu Colliery. A study of colonial housing requirements is being undertaken in the Colonial Office with a view to affording colonial governments assistance in planning such developments.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED MAY 2

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1005; whooping-cough, 1623; diphtheria, 743; paratyphoid, 13; typhoid, 10; measles (excluding rubella), 4006; pneumonia (primary or influenzal), 813; puerperal pyrexia, 147; cerebrospinal fever, 149; poliomyelitis, 5; encephalitis lethargica, 3; dysentery, 160; ophthalmia neonatorum, 100. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns there were 3 (0) deaths from enteric fevers, 3 (0) from scarlet fever, 6 (0) from measles, 11 (2) from whooping-cough, 17 (1) from diphtheria, 30 (2) from diarrhœa and enteritis under 2 years, and 22 (0) from influenza. The figures in parentheses are those for London itself.

Southend, Bristol and Norwich each reported a fatal case of enteric fever. There were 3 deaths from diphtheria at Liverpool.

The number of stillbirths notified during the week was 222 (corresponding to a rate of 34 per thousand total births), including 20 in London.

The D.S.O. has been awarded to A/Surgeon Commander D. M. Craig, M.R.C.S., R.N.V.R., for gallantry and skill in the Battle of Crete while serving in H.M.S. *Dido*.

BOOKLET ON SULPHONAMIDE ESTIMATION.—A knowledge of the sulphonamide content of biological fluids—especially of the blood—is being required more and more, while the number of methods and modifications published is rapidly increasing. Messrs. May and Baker have now published a brief survey of the principal methods ("Estimation of Sulphonamides"). From the standpoint of the clinical laboratory perhaps insufficient attention is paid to the use in these analyses of Lovibond comparator discs, which obviate the use of standard solutions. This is, however, a small point and most pathologists will find the booklet of very real help.

Obituary

DAVID YELLOWLEES

M.B. GLASG. ; CAPTAIN R.A.M.C.

Captain David Yellowlees, who died on active service in the Middle East in April at the age of 26, was the elder son of Dr. David Yellowlees of Glasgow. He was educated at Glasgow Academy, and took his medical training at Glasgow University, where he graduated in September, 1938. As a student he gained, among other awards, the Mackintosh bursary in psychological medicine. He had a strong family association with that subject, as his grandfather was medical superintendent of the Glasgow Royal Mental Hospital, his father is medical director of the Glasgow Lansdowne Clinic for functional nervous disorders, and his uncle is physician for psychological medicine at St. Thomas's Hospital. After graduation Yellowlees held house-appointments at the Glasgow Western Infirmary, and joined the RAMC in January, 1940. Soon he was attached to a neuropathic hospital with which he served in this country for 18 months. He went overseas with it at the end of last year.

E. Kingsley Taylor, Minehead

David Yellowlees had wide and keen interests outside his professional work. He was a member of the rugby XV and the shooting VIII at school and of the rugby XV at the university, and he took every opportunity of climbing and photographing the mountains of Scotland.

ERNEST ROBERT SORLEY

M.D. ABERD., D.P.H. ; SURGEON COMMANDER, R.N.

Surgeon Commander E. R. Sorley, whose death on active service is now presumed, graduated M.B. from the University of Aberdeen in 1923, and entered the Navy in 1925. Throughout his service career he continued to work for higher qualifications and took his D.P.H. in 1928 and his M.D. in 1935. He was always on the watch for the new, and as early as 1934 he reported on the intravenous and oral administration of 'Evipan,' while he used 'Prontosil Album' in the treatment of malaria when it was still at the experimental stage. While serving in Bermuda in 1933 he described in our own columns how the disability period of lymphogranuloma inguinale could be shortened by intensive treatment with tartar emetic. Lately he had been making observations in the tropics on manual labour, when wearing service respirators, and when he died a paper on streptococcal periostitis of the tibia was in the press.

Sorley was a capable physician, and as his responsibilities increased in the Navy he also showed a flair for successful organisation. He was one of those fortunate people who excel at play as well as at work ; rugby, cricket and tennis were his games, and he has himself described an assault on Kilimanjaro in which he took part. He leaves a wife and children.

HENRY ALBERT JOHN GIDNEY

KT., L.S.A., F.R.C.S.E., D.P.H., D.O.

Sir Henry Gidney, who died of heat stroke at Delhi in his 69th year, spent twenty years in the Indian Medical Service before he entered public life to become the acknowledged leader of the Anglo-Indian Community. His father was Irish, his mother Indian. Born in 1873 in the Western States he took his schooling at Bangalore and Bombay and his professional course at the Medical College, Calcutta. At the age of 23 he qualified L.S.A. from University College, London, going on to take the Edinburgh surgical fellowship and diplomas in public health and ophthalmology. Thus equipped he had wide experience in civil surgeoncies and various frontier campaigns, and acquired a dexterity in cataract operations which kept him busy in India and led to a lectureship at Oxford. During the last war he was wounded in action ; he rose to the rank of brevet lieutenant-colonel, and was invalided out in 1918. In later years he put up a splendid fight for his community, on deputations and at the Round Table Conference, and secured amendments in the 1935 Act. Lately he had joined the National War Council of India. He was knighted in 1931.

FAMILY ALLOWANCES CONSIDERED

Sir Kingsley Wood in a White Paper (Cmd. 6354. H.M. Stationery Office. 2*d*.) has reviewed the practical difficulties which would have to be overcome in order to establish a system of family allowances. These difficulties, which are chiefly financial, vary with the type of scheme considered. A non-contributory scheme, financed entirely by the Exchequer and providing 5*s*. a week for every child below the age of 15, would cost £132 million a year. If the first eligible child was left out in every family the cost would be about £58 million ; and if the first two eligible children were excluded the cost would be £23 million. The scheme could be limited in other ways ; thus it might be confined to the children of poorer parents, in which case the parents would have to submit to an income test, or else it would have to be made to apply to parents insured under the compulsory pensions scheme, or to those with a child at an elementary school, or to those not receiving income-tax relief for their children. There are objections to all of these devices ; nor could they easily be avoided by linking the scheme up with the existing scheme of relief of income-tax for children, because that would mean that whenever the Chancellor of the Exchequer contracted or extended the field over which income-tax was levied he would automatically contract or extend the field over which parents would be regarded as needing cash allowances for their children. This would in turn increase the cost of reducing income-tax, because as soon as tax liability was reduced a whole new group of parents would become eligible for children's allowances.

Payments for children out of other national funds could of course be saved if family allowances were adopted, and these would amount to about £7 million a year. By allowing for this, the cost of a scheme to cover every child of compulsorily insured parents or of those with incomes of £420 or less, could be reduced to £117 million ; or if the first eligible child got nothing, to £52 million. With a scheme covering all children of parents with an income of less than £260 the cost would be £52 million ; or, without the first child, £46 million. By leaving out the first two eligible children the cost could be reduced to £21 million and £18 million for the two income groups.

A contributory scheme is also considered in the paper. It would have to be compulsory, probably being grafted on the pensions scheme. It would be difficult to decide the contributions to be paid by men and by women, and to define the position of voluntary contributions and of those who, having entered the scheme compulsorily, cease to be insurably employed. An allowance of 5*s*. for every child would require a total contribution of £114 million, or the equivalent of 2*s*. 8*d*. per insured person per week. This could be reduced to 1*s*. 2½*d*. by excluding the first child and to 6*d*. by excluding the first two. No allowance has been made in Sir Kingsley's figures for the cost of administering either contributory or non-contributory schemes. The difficulties of providing family allowances are thus not small ; nor is the end to be achieved.

ROCHE PRODUCTS LTD. have introduced a water-soluble vitamin-K analogue under the name 'Synkavit,' consisting of the tetrasodium salt of 2-methyl-1 : 4 naphthohydroquinone diphosphate. This is said to be highly potent, stable, injectable either by the intravenous or intramuscular route, and effective by mouth without the addition of bile-salts.

Medical News

University of Oxford

On April 30 the following degrees were conferred :—

M.D.—* Reginald Passmore.

M.B.—W. M. Tucker, P. C. Reynell, R. J. Rossiter, K. G. Westcombe, R. G. Ludkin, P. R. Wright, E. A. Spriggs, A. P. Binks, H. A. W. Forbes, M. P. Lewis, C. G. Phillips, J. M. Walker, James Ackerley, B. F. Swynnerton, R. M. Mason, E. H. Seward, R. G. Sykes, C. R. S. Jackson, P. W. Roe, C. A. Simmons, R. B. Crail, C. H. Jellard, Mary F. Richardson, * D. F. Macgregor, * C. L. Hall, and * A. H. Ferguson.

* In absence.

University of Cambridge

The title of the degrees of M.B., B.Chir. has been conferred on Mrs. K. Ferguson of Newnham College.

Society of Apothecaries of London

G. K. Coombes, King's Coll. and West Lond. and J. A. Dodds, Manc. having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery and midwifery.

Medico-Legal Society

A meeting of this society will be held at 26, Portland Place, London, W.1, on Thursday, May 28, at 5.45 P.M., when Mr. C. E. A. Bedwell will read a paper on Medical Members of the Inns of Court.

Royal Society of Arts

On Wednesday, May 20, at 1.45 P.M., this society will meet at its house in John Adam Street, Adelphi, London, W.C.2, when Prof. H. D. Kay, D.Sc., will speak on the future of the milk industry.

Society for Relief of Widows and Orphans of Medical Men

The annual general meeting will be held on Wednesday, May 20, at 11, Chandos Street, London, W.1, at 5 P.M.

Medical Casualties

The deaths of Major R. L. Frost, M.R.C.S., I.M.S. and Captain P. A. Narayan, I.M.S., were announced in a recent casualty list. Captain E. V. Parker, M.B. Durh., R.A.M.C., and Lieut.-Colonel J. L. O'Neill, L.R.C.P.I., I.M.S., have been posted as wounded. Major N. I. McLeod, L.M.S. Nova Scotia, I.M.S., is reported missing, and Captain J. A. Glover, M.B. Camb., R.A.M.C., has also been missing since the fall of Singapore.

Royal Medico-Psychological Association

This society will meet on Wednesday, May 20, at the County Offices, Preston, at 10.30 A.M., when Mr. Thomas Graves, the president, will open a discussion on ear, nose, and throat disease in mental disorder and collaboration in its investigation and treatment. Mr. H. G. Bedford Russell, Mr. W. Stirk Adams, Dr. J. J. Craig, Dr. F. A. Pickworth and Dr. H. F. Fenton will also speak.

Royal Society of Medicine

The fellows of this society will meet at 5 P.M., on Tuesday, May 19, to nominate officers and council for next year and to ballot for the election to the fellowship. At 4.30 P.M., on the same day, at the section of psychiatry, Dr. Felix Brown will read a paper on the heredity of psychoneuroses. On May 21, at 5 P.M., at the section of dermatology, Dr. Sybil Horner will speak on industrial dermatitis, Dr. A. D. K. Peters on dermatitis in filling factories, and Major W. J. O'Donovan on dermatitis castrensis. The section of neurology will meet at 4.30 P.M. on the same day, when Major Hugh Garland, Mr. Norman Dott and Mr. Grey Walter will open a discussion on traumatic epilepsy. At the section of epidemiology and state medicine on May 22, at 2.30 P.M., Dr. T. F. McNair Scott and Dr. Paul Beeson will speak on acute myalgia of the neck and shoulders and its possible relation to generalised fibrositis. The section of disease in children will hold a joint meeting with the maternity and child-welfare group of the Society of Medical Officers of Health on May 22, at 5 P.M., when Dr. Alan Moncrieff, Dr. C. E. Field, Dr. Nora Wattie and Dr. Virginia Saunders-Jacob will be the openers in a discussion on the prevention of chronic lung diseases in childhood.

Applications for the William Gibson research scholarship for medical women should be sent to the secretary of the society, 1, Wimpole Street, London, W.1, not later than June 1.

London School of Dermatology

A course of lectures on skin diseases in war-time is being held at the London Hospital for Diseases of the Skin, Lisle Street, W.C.2, on Wednesdays, at 4.30 P.M. On May 20 Dr. William Griffith will speak on eczema, on May 27, Dr. R. T. Brain on psoriasis; on June 3, Mr. Henry Corsi on pus-coccal and ringworm infections; and on June 10, Dr. J. E. M. Wigley on scabies and parasitic infections.

Westminster Hospital

A gift of £4000 has been made to this hospital by a former patient to establish the Keystone fund for radium research.

EIGHTEEN delegates from non-teaching voluntary hospitals in Lancashire met at the District Infirmary, Ashton-under-Lyne, to consider the formation of an association which would concern itself with the welfare of the hon. medical staffs of these hospitals now and after the war. A resolution was passed setting up the Medical Staffs' Association of Non-teaching Voluntary Hospitals of Lancashire. Further information may be had from the acting temporary hon. secretary, Dr. Bernard Bowman, District Infirmary, Ashton-under-Lyne.

The Honyman-Gillespie lectures which are being held at the London Homœopathic Hospital on Tuesdays will take place at 3 P.M.

MEMBERS of the public in Germany are now forbidden to give testimonials for proprietary medicines (*Klin. Wschr.* Feb. 21, 1942, p. 192).

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

Appointments

Colonial Medical Service.—The following appointments are announced :—

BRUCE, L. G., M.B. GLASG. : medical officer, Uganda;
ELLIS-JONES, D. W., M.B. LPOOL : medical officer, Tanganyika;
LAWES, W. E., L.R.C.P.E. : medical officer, Kenya;
SINGLETON, A. C. B., M.B. ABERD. : medical officer, Kenya; and
WILKINSON, P. B., M.B. LOND., M.R.C.P. : district medical officer, Cyprus.

Births, Marriages and Deaths

BIRTHS

COLEMAN.—On May 2, at Hertford, the wife of Mr. Mark Coleman, M.S.—a son.

FISHER.—On May 11, in London, the wife of Dr. J. W. Fisher—a daughter.

GOOD.—On May 8, at Aylesbury, the wife of Lieut.-Colonel Michael Good, R.A.M.C.—a son.

JAUCH.—On May 9, at Grantham, the wife of Mr. F. Joselin Jauch, F.R.C.S.—a daughter.

LERNER.—On May 9, in London, the wife of Captain Alec Lerner, R.C.A.M.C.—a son.

PHILP.—On May 6, at South Croydon, the wife of Capt. R. A. Philp, R.A.M.C.—a daughter.

PRATT.—On May 7, in London, the wife of Dr. J. S. Pratt—a daughter.

WARE.—On May 2, at Bury St. Edmunds, the wife of Dr. H. A. Ware—a son.

WIGRAM.—On May 5, at Oxford, the wife of Captain Edmund H. L. Wigram, R.A.M.C.—a son.

MARRIAGES

EVANS—FOORD.—On May 8, at Speldhurst, Kent, Gwilym Rhys Evans, M.B., lieutenant R.A.M.C., to Jean Marjorie Foord.

WATT—STEWART.—On May 9, at Aberdeen, Leslie Watt, M.B., captain R.A.M.C., to Freda F. Stewart, 2/subaltern, A.T.S.

WOOD—SUTCLIFFE.—On May 9, in London, Benjamin Stuart Blackford Wood, B.M., R.A.M.C., to Elizabeth Cowan Sutcliffe, M.B.

DEATHS

ANDREWS.—On May 7, at Iford, near Lewes, Henry Russell Andrews, M.D. LOND., F.R.C.P., F.R.C.O.G., aged 70.

CHAFFEY.—On May 8, at Hove, Wayland Charles Chaffey, M.D. LOND., aged 86.

COUPER.—On May 5, Samuel Barrett Couper, B.A. CAMB., M.R.C.S., of Blaby, Leicestershire.

FITCH.—On May 11, Laurence Percival Fitch, M.R.C.S., aged 34.

FOY.—On May 9, at Crawley Down, Sussex, Harry Andrew Foy, M.R.C.P.E., D.T.M. & H., D.P.H.

GRIMSDALE.—On May 5, at Hindhead, Harold Barr Grimsdale, M.B. CAMB., F.R.C.S., formerly of Cambridge Gate, London.

SPURRELL.—On May 9, at Banningham, Aylsham, Norfolk, William Dewing Spurrell, M.R.C.S., aged 76.

WARD.—On May 3, at Galmpton, near Brixham, Thomas Hamilton Ward, M.D. EDIN., aged 76.

WEBB.—On April 17, Charles Alfred Webb, M.R.C.S., D.P.H., colonel late R.A.M.C. retd., aged 84.

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(UNIVERSITY OF LONDON)

WAR MEDICINE COURSE—1st to 5th June, 1942

Monday, 1st June	10 A.M.	Skin Diseases in War ..	Dr. R. T. Brain, M.D., F.R.C.P.
	11.30 A.M.	The Prevention in Barracks and the Field of Certain Wartime Diseases of Special Military Importance.	Lieut.-Colonel C. S. Ryles, O.B.E., R.A.M.C.
	1.30 P.M.	The Prevention in Barracks and the Field of Certain Wartime Diseases of Special Military Importance (contd.).	Lieut.-Colonel C. S. Ryles, O.B.E., R.A.M.C.
	3 P.M.	Prescribing in Wartime ..	Dr. P. Hamill, F.R.C.P.
Tuesday, 2nd June	10 A.M.	War Neuroses	Colonel J. R. Rees, M.D., M.R.C.P.
	11.30 A.M.	War Neuroses (contd.) ..	Colonel J. R. Rees, M.D., M.R.C.P.
	1.30 P.M.	Tuberculosis in Wartime and Industry.	Dr. A. J. Morland, M.D., M.R.C.P.
	3 P.M.	Effects of Blast	Mr. S. Zuckerman, M.A., D.Sc.
Wednesday, 3rd June	10 A.M.	T.N.T. Poisoning and War Hazards in Industry.	Dr. Donald Hunter, M.D., F.R.C.P.
	11.30 A.M.	The Pathology of War Gas Poisoning.	Prof. G. R. Cameron, D.Sc., F.R.C.P.
	1.30 P.M.	Treatment of Gas Casualties	Prof. J. Nixon, C.M.G., M.D., F.R.C.P.
	3 P.M.	Immersion Foot	Surg. Commander C. C. Ungley, F.R.C.P.
Thursday, 4th June	10 A.M.	Effort Syndrome	Dr. P. Wood, M.D., F.R.C.P.
	11.30 A.M.	Food Poisoning	Sir Wm. Savage, M.D., L.R.C.P.
	1.30 P.M.	Medical Aspects of Head Injuries.	Major W. R. Russell, M.D., F.R.C.P.
	3 P.M.	Epidemiology of Paratyphoid Fever.	Sir Wm. Savage, M.D., L.R.C.P.
Friday, 5th June	10 A.M.	Crush Injuries	Dr. E. G. Bywaters, M.R.C.P.
	11.30 A.M.	Sulphonamide Drugs in War.	Colonel L. E. H. Whitby, C.V.O., M.D., F.R.C.P.
	1.30 P.M.	Salt and Water	Dr. R. A. McCance, M.D., F.R.C.P.
	2.30 P.M.	Practical Management of Wound Shock.	Dr. J. McMichael, M.D., F.R.C.P., F.R.S.E.
	3.30 P.M.	Dyspepsia in War.. ..	Dr. C. E. Newman, M.D., F.R.C.P.

The fee for the Course will be one guinea, but no fee will be charged in the case of officers of the Armed Forces who are nominated for the course by their respective Director-Generals. Applications for admission should be addressed to the DEAN, British Postgraduate Medical School, Ducane-road, W.12.

Further War Courses will commence as follows:—

TREATMENT OF FRACTURES (limited to 40)	MONDAY, 15TH JUNE, 1942.
WAR SURGERY OF THE CHEST	MONDAY, 29TH JUNE, 1942.
WAR SURGERY OF THE NERVOUS SYSTEM	MONDAY, 13TH JULY, 1942.

Royal College of Physicians of London.

The next ordinary PROFESSIONAL EXAMINATION for the MEMBERSHIP will commence on WEDNESDAY, 1ST JULY, 1942.

Candidates are required to give twenty-one days' notice in writing to the Registrar of the College, to whom all certificates and testimonials required by the Bye-laws must be sent at the same time.

Candidates who propose to submit published work under the regulations now in force are required to give twenty-eight days' notice, and should apply in writing to the Registrar, without delay, for detailed instructions as to the procedure they should follow.

H. E. A. BOLDERO, D.M., Registrar.

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Astley Cooper Studentship.

GUY'S HOSPITAL.

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Particulars regarding the Studentship can be obtained from the SECRETARY to the Astley Cooper Trustees, Medical School Office, Guy's Hospital, S.E.1, to whom applications for the post should be addressed on or before 30th June, 1942.

University of Glasgow.

FACULTY OF MEDICINE.

Notice is hereby given that the number of students to be admitted to the FIRST YEAR COURSES IN MEDICINE in OCTOBER, 1942, will be limited. Forms of application for permission to commence the study of medicine then may now be obtained from the undersigned. These forms must be returned by applicants not later than 15th June, 1942.

Applicants who wish to have a form sent by post should enclose a stamped addressed envelope.

May, 1942. ROBT. BROUGH, Registrar.

L. M. S. S. A.

FINAL EXAMINATION: SURGERY, June 8th, July 13th, August 10th, 1942; MEDICINE, June 15th, July 20th, August 17th, 1942; MIDWIFERY, June 16th, July 21st, August 18th, 1942.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

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This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods: insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombieres treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

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Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

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Completely detached Villas for mild cases. Voluntary Patients received. Twenty acres of grounds; own garden produce. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actino-therapy, prolonged immersion baths, shock and also modified insulin treatment. Chapel.

Senior Physician, Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are strictly moderate, may be obtained upon application to the Secretary

The Convalescent Branch is HOVE VILLA, BRIGHTON, and is 288 ft. above sea-level

PECKHAM HOUSE, 112, Peckham Road, London, S.E.15

Telegrams: "Alleviated, London" — **Telephone: Rodney 2641-2642**

A Private Mental Hospital, for Ladies and Gentlemen suffering from Nervous and Mental Illness, where the amenities of a comfortable home are combined with full investigation and every well-established modern treatment.

Terms from 3½ guineas weekly.

Illustrated Prospectus may be obtained from the Physician Superintendent.

COURT HALL, KENTON, near EXETER

FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES — Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach. There is also a charming house, EBWORTHY, MANATON, DARTMOOR, situated in 20 acres, 1100 ft. up for bracing moorland air

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. — *Telephones*—STARCROSS 259 and TEIGNMOUTH 289

CHEADLE ROYAL — CHEADLE CHESHIRE

A Registered Hospital for MENTAL DISEASES, and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales

THE object of this Hospital is to provide the most efficient means for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL and NERVOUS DISEASES. The Hospital is governed by a Committee appointed by the Trustees of the Manchester Royal Infirmary. VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS RECEIVED

For Terms and further information apply to the MEDICAL SUPERINTENDENT *Telephone:* GATLEY 2231

THE COTSWOLD SANATORIUM

On the Cotswold Hills seven miles from Cheltenham, Stroud and Gloucester. Fully equipped for the treatment of all forms of Tuberculosis. **Terms: 5½ to 9½ guineas per week, inclusive.** Full particulars from MEDICAL SUPERINTENDENT, Cotswold Sanatorium, Cranham, Gloucester. *Telephone:* Witcombe 81. *Telegrams:* "Hoffman, Birdlip."

TOR-NA-DEE SANATORIUM

Managing Director: DAVID LAWSON, M.D., F.R.S.E.

FOR THE TREATMENT OF PULMONARY TUBERCULOSIS AND ALLIED DISEASES

Medical Superintendent: R. Y. KEERS, M.D. (Edin.)

For prospectus apply to The Secretary, Tor-na-Dee, Murtle, Aberdeenshire Telephone: Cults 107

CHISWICK HOUSE,

PINNER, MIDDLESEX.

Telephone: PINNER 234.

A Private Hospital for the Treatment and Care of Mental and Nervous Illnesses in both Sexes.

A modern country house, 12 miles from Marble Arch, in attractive and secluded surroundings. Fees from 10 guineas per week inclusive. Cases under Certificate, Voluntary and Temporary Patients received for treatment.

DOUGLAS MACAULAY, M.D., D.P.M.

UNIVERSITY EXAMINATION POSTAL INSTITUTION

17, RED LION SQUARE, LONDON, W.C.1

Over 50 years' experience

POSTAL COACHING FOR ALL MEDICAL EXAMINATIONS

MEDICAL PROSPECTUS (36 pages)

sent gratis, along with List of Tutors, &c., on application to the Principal, 17, Red Lion-square, London, W.C.1. (Telephone: HOLborn 6318.)

Examining Surgeons:

FACTORIES ACT, 1937.

The following appointments as Examining Surgeon under the Factories Act, 1937, are vacant.

Applications should be sent to the CHIEF INSPECTOR OF FACTORIES, 28, Broadway, London, S.W.1.

District	*County*	*Latest date for receipt of application*
BRIGHOUSE	YORK (WEST RIDING)	26th May, 1942.
MILBORNE PORT ..	SOMERSET ..	26th May, 1942.

London County Council.

Medical practitioners required for undermentioned positions. Married quarters not available.

TEMPORARY ASSISTANT MEDICAL OFFICERS, Class I (B1).—Salary £350–£25–£425. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply.

HACKNEY HOSPITAL, High-street, Homerton.—Medical duties.

*ST. CLEMENT'S HOSPITAL, 2A, Bow-road, E.3.—General and medical duties.

*With allowance of £50 a year while the position ranks deputy to Medical Superintendent.

TEMPORARY ASSISTANT MEDICAL OFFICERS, Class II (B2).—Salary £250. R practitioners who hold A posts may apply when appointment will be limited to six months.

HACKNEY HOSPITAL, High-street, Homerton.	General medical or with surgical bias.
HIGHGATE HOSPITAL, Dartmouth Park Hill, N.19.	
ST. ANDREW'S HOSPITAL, Devons-road, Bow, E.3.	
ST. STEPHEN'S HOSPITAL, 369, Fulham-road, S.W.10.	
ST. MARY, ISLINGTON, HOSPITAL, Highgate Hill, N.19.	
ST. NICHOLAS' HOSPITAL, 79, Tewson-road, Plumstead, S.E.18.	

QUEEN MARY'S HOSPITAL FOR CHILDREN, Carshalton.

All positions are with board, lodging, and washing. Application forms obtainable, stamped foolscap envelope necessary, from the MEDICAL OFFICER OF HEALTH (S.D.2), County Hall, S.E.1, returnable by 25th May.

Canvassing disqualifies.

Middlesex County Council.

ASSISTANT MEDICAL OFFICER (Temporary) required in PUBLIC HEALTH AND SCHOOL MEDICAL DEPARTMENT. Qualified registered medical practitioners with special experience of ante-natal work. Public Health degree or diploma desirable. Whole-time duties under County Medical Officer include medical inspection of school-children. Supervision of treatment of minor ailments, carrying out work under maternity and child welfare scheme, &c. Salary £600 per annum, with out-of-pocket travelling expenses. Subject to medical examination and one months' notice. Must reside in such district as required.

Written applications, giving age, qualifications, and experience, with copies of not more than three recent testimonials, to the undersigned by 30th May, 1942. Application forms not provided. C. W. RADCLIFFE, "B3," Clerk of the County Council. Middlesex Guildhall, Westminster, S.W.1.

Resident Junior Assistant Medical

OFFICER (B2) required by MIDDLESEX COUNTY COUNCIL for HAREFIELD COUNTY SANATORIUM HOSPITAL, Harefield, Middlesex. Applications invited from registered medical practitioners, Men or Women, who have held resident appointments in general hospitals, and also from R practitioners who now hold A posts. Experience in modern treatment of tuberculosis an advantage. Salary £250 per annum, plus war bonus. Board, lodging, and laundry. Whole-time duties, such as Council may direct, under supervision of Medical Superintendent. Appointment, subject to medical examination and one month's notice, is for six months with possibility of extension to twelve months (except in case of R practitioners). Post now vacant.

Applications, stating age, qualifications with dates, nationality, present post, and previous appointments, to the undersigned. No application forms provided. Relationship to any member or officer of the Council to be disclosed. Copies of not more than three recent testimonials. Canvassing, directly or indirectly, will disqualify. Closing date 23rd May, 1942.

C. W. RADCLIFFE, "B3," Clerk of the County Council. Middlesex Guildhall, Westminster, S.W.1.

Resident Junior Assistant Medical

OFFICER (B2) required by MIDDLESEX COUNTY COUNCIL for REDHILL COUNTY HOSPITAL, Edgware, Middlesex. Applicants must be registered medical practitioners, Men or Women, who have held resident appointments in general hospitals, and also from R practitioners who now hold A posts. Salary £250 per annum, plus cost-of-living bonus. Board, lodging, and laundry. Whole-time medical duties such as Council may direct under supervision of Medical Superintendent. Appointment, subject to medical examination and one month's notice, is for six months with possibility of extension to twelve months (except in case of R practitioners). Post vacant 1st July, 1942.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, to the undersigned. Application forms not provided. Relationship to any member or officer of Council to be disclosed. Copies of not more than three recent testimonials. Canvassing, directly or indirectly, will disqualify. Closing date 30th May.

C. W. RADCLIFFE, "B3," Clerk of the County Council. Guildhall, Westminster, S.W.1.

Chelsea Hospital for Women, S.W.3.

Applications are invited from registered medical practitioners, Male or Female, for the post of HOUSE SURGEON (B2), from the 1st July next, open to "R" practitioners who now hold "A" posts, when appointment will be limited to six months otherwise may be extended. Salary is at the rate of £200 per annum, with board, residence and laundry.

Full particulars, accompanied by copies of three recent testimonials, should be forwarded not later than Monday, June 1st, to—

GEO. W. COOLING, Secretary.

University of London.

The Senate invite applications for the UNIVERSITY CHAIR OF BIOCHEMISTRY tenable at ST. THOMAS'S HOSPITAL MEDICAL SCHOOL. Salary £1000 a year.

Applications must be received not later than first post on Monday, 8th June, 1942, by the ACADEMIC REGISTRAR, University of London, Richmond College, Richmond, Surrey, from whom further particulars should be obtained.

Royal National Throat, Nose, and Ear

HOSPITAL (incorporating CENTRAL LONDON and GOLDEN SQUARE THROAT, NOSE, AND EAR HOSPITALS), Gray's Inn-road and Golden-square, London.

HOUSE SURGEON (B2) (MALE OR FEMALE).

Applications are invited from registered medical practitioners, including R practitioners who now hold A posts, for the above post at Gray's Inn-road, which becomes vacant on 1st July next. To R practitioners the appointment is limited to six months; otherwise it will be for a period of nine months. Salary at the rate of £100 per annum.

Applications, stating age, qualifications, nationality, and accompanied by copies of not more than three recent testimonials, should be sent to the undersigned by 25th May.

There are vacancies for CLINICAL ASSISTANTS to attend at the following times:—

At Golden-square:	Mondays, 10 A.M.	Fridays, 2 P.M.
	Thursdays, 2 P.M.	Saturdays, 10 A.M.
At Gray's Inn-road:	Wednesdays, 10 A.M. and 2 P.M.	
	Thursdays, 10 A.M. and 2 P.M.	
	Saturdays, 10 A.M.	

The posts, which are honorary, afford good opportunities for obtaining extended knowledge of the specialty, as the duties consist of assisting the surgeons in the treatment of patients.

Applications, which may be for periods of three, six, or twelve months, should state for which Hospital and for which times they are made, and be sent as soon as possible to—

JOHN H. YOUNG, Secretary-Superintendent.

HIS MAJESTY'S COLONIAL SERVICE

THE COLONIAL MEDICAL SERVICE

VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.

Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.

The normal salary scale is from £630 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.

Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.

Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.

London Chest Hospital,

Victoria Park, E.2.

Vacancy for HOUSE PHYSICIAN (B2) will occur on July 1st, 1942. R practitioners now holding A posts may apply. Six months appointment. Salary at the rate of £150 per annum, board, residence and laundry provided.

Applications, with copies of three testimonials, should be sent at once to the Secretary.

Willesden General Hospital,

Harlesden-road, N.W.10.

Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE PHYSICIAN (A) to become vacant on the 1st July, 1942, including R practitioners within three months of qualification. The appointment will be for a period of six months. Salary at the rate of £130 per annum with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, accompanied by copies of three recent testimonials, should be sent not later than the 5th June, 1942, to—

J. N. DRAKE, Secretary.

County Borough of West Ham.

PLAISTOW FEVER HOSPITAL. (210 Beds.)

Applications are invited for the post of JUNIOR ASSISTANT MEDICAL OFFICER (B2) (Male or Female) at the above Hospital. The appointment will be for a period of twelve months, and preference will be given to candidates who have held a resident appointment in a general hospital. Suitably qualified R practitioners holding A posts may apply, in which case the appointment will be for six months. Good facilities for postgraduate study are available.

The salary for the post is £300 per annum, together with residence, board, and laundry.

There is a first-aid post at the Hospital, and the person appointed will be required to assist at this post during emergencies.

Application forms can be obtained from Dr. E. Ashworth Underwood, Medical Officer of Health, 88, Romford-road, West Ham, E.15, and should be returned, together with copies of not more than three testimonials, to the Town Clerk, Town Hall, West Ham, E.15, not later than 26th May, 1942.

CHARLES E. CRANFIELD, Town Clerk.

Town Hall, West Ham, E.15, 4th May, 1942.

Oldchurch County Hospital, Romford.

APPOINTMENT OF PATHOLOGIST AND ASSISTANT MEDICAL OFFICER (B1)

The County Council of the Administrative County of Essex invite applications from registered medical practitioners for the above appointment at the Oldchurch County Hospital, Romford (968 Beds).

Applicants should have had special experience in bacteriology and clinical pathology. The Hospital may shortly be undertaking laboratory work in connection with the Public Health services, in addition to the usual work carried out in a hospital laboratory. Suitably qualifying R practitioners holding B2 or B1 posts may apply.

The post is non-resident and the salary is at the rate of £600 a year, rising, subject to satisfactory service, by annual increments of £25 to a maximum of £800 a year, but the commencing salary may be varied having regard to the experience and capabilities of the candidate appointed.

Applications, accompanied by copies of not more than three recent testimonials, should reach me not later than 6th June, 1942.

Canvassing, whether directly or indirectly, is forbidden.

JOHN E. LIGHTBURN, Clerk of the County Council.

County Hall, Chelmsford, 11th May, 1942.

Borough of Barking.

Applications are invited from qualified medical practitioners for the designated appointment of TEMPORARY DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY SCHOOL MEDICAL OFFICER.

Candidates must have had experience in public health work and must hold a registrable qualification in public health.

Salary scale £725—£25—£800, and a cost-of-living bonus is at present payable.

Particulars of duties and application form, which must be returned to the undersigned on or before the 1st June, 1942, may be obtained from the Medical Officer of Health, Town Hall, Barking.

Town Hall, Barking, Essex. E. R. FARR, Town Clerk.

County Council of Essex and URBAN DISTRICT COUNCIL OF THURROCK.

COMBINED MEDICAL SERVICE.

Applications are invited from duly qualified medical practitioners, holding a Diploma in Public Health, for the appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH AND DEPUTY MEDICAL OFFICER OF HEALTH. The appointment is a temporary one.

The salary attaching to the post will be at the rate of £700 a year, rising, subject to satisfactory conduct and service, by annual increments of £25 to £800 a year, but the commencing salary may be varied having regard to the experience and capabilities of the candidate appointed.

Forms of application may be obtained from the Clerk of the County Council, to whom they should be returned completed, accompanied by copies of three recent testimonials, not later than Saturday, 6th June, 1942.

Canvassing, whether directly or indirectly, is forbidden.

JOHN E. LIGHTBURN, Clerk of the County Council.
A. E. POOLE, Clerk to the Urban District Council of Thurrock.

County Hall, Chelmsford, 11th May, 1942.

County of Kent.

PUBLIC HEALTH DEPARTMENT.

APPOINTMENT OF ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH.

Applications are invited for the above-mentioned wholetime appointment on the central medical staff of the Public Health Department.

The duties of the post will be mainly in connection with Maternity and Child Welfare Services and will be both administrative and clinical.

The salary is at the rate of £700 a year with subsistence and travelling allowances according to the County Council's scale.

The post is superannuable, and the successful candidate will be required to pass a medical examination.

Forms of application can be obtained from the County Medical Officer, County Hall, Maidstone, and completed application forms must be returned to him not later than 30th May, 1942.

W. L. PLATTS, Clerk of the County Council.

County Hall, Maidstone, 8th May, 1942.

City of Bradford Municipal General HOSPITAL.

Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (B1) to become vacant shortly. Suitably qualified practitioners holding B2 or B1 appointments are asked to apply. Salary at the rate of £350 per annum with full residential emoluments.

Forms of application may be obtained from the Medical Officer of Health, Town Hall, Bradford, and should be returned not later than the 25th May, 1942.

N. L. FLEMING, Town Clerk.

Town Hall, Bradford, 9th May, 1942.

City of Nottingham.

CITY ISOLATION HOSPITAL AND SANATORIUM.

Applications are invited for the post (B2) of RESIDENT MEDICAL OFFICER, Male or Female, at the above Hospital of approximately 200 Beds. Married quarters not available. Salary will be fixed between £250 and £350 (plus war bonus), according to experience and suitability of selected candidate. The duties are mainly in connexion with the Fever Section of the Hospital. R practitioners holding A posts may apply when appointment will be limited to six months; otherwise renewable for a further six months. Preference will be given to candidates who have held a resident appointment in a general hospital. Fever experience or the holding of the D.P.H., although not essential, would be an additional qualification.

Application forms, to be obtained from me, should be returned forthwith. J. E. RICHARDS, Town Clerk.

The Guildhall, Nottingham, May, 1942.

County of Southampton.

Applications are invited for the post of TEMPORARY ASSISTANT COUNTY MEDICAL OFFICER. Preference will be given to a Woman with experience in maternity and child welfare; experience in other branches of public health and school medical work will be an advantage. Salary £600 a year, rising on approved service by increments of £25 per annum to £750, subject to deductions for pension, with travelling allowances on the County Council scale for the time being in force.

Applications, with copies of not more than three testimonials, upon a form which, with the conditions of appointment, may be obtained from the County Medical Officer, The Castle, Winchester, should reach him not later than the 30th May, 1942.

F. V. BARBER, Clerk of the County Council.

The Castle, Winchester, 7th May, 1942.

Surrey County Council.

PUBLIC ASSISTANCE DEPARTMENT.

RICHMOND P.A. INSTITUTION (350 Beds), INCLUDING GROVE ROAD HOSPITAL (180 Beds).

Applications are invited for the appointment of RESIDENT ASSISTANT MEDICAL OFFICER (B1), tenable for the duration of the war and subject to one month's notice on either side. R practitioners holding B2 or B1 appointments may apply. In addition to the medical treatment of Surrey civilian sick, the Medical Officer will take part in the clinical work of the Medical Scheme Section of the Hospital. Salary will be fixed at a point on the scale £350–£25–£450 per annum, plus residential emoluments.

Applications, stating age, qualifications, and experience, and enclosing copies of not more than three recent testimonials, should be sent to the COUNTY MEDICAL OFFICER, County Hall, Kingston-on-Thames, not later than 28th May, 1942.

Hertfordshire County Council.

BROCKET HALL MATERNITY HOSPITAL, WELWYN, HERTS.

Applications are invited for post of RESIDENT MEDICAL OFFICER (B2) to this Hospital of 50 Beds, staffed by the City of London Maternity Hospital. The person appointed will work under the direction of the County Obstetric Consultant, Mr. Eardley Holland. Salary at the rate of £200 per annum. Duties to begin early in June. R practitioners holding A posts may apply when appointment will be limited to six months, otherwise may be extended to 12 months.

Applications, with two references, to County Medical Officer, County Hall, Hertford, Herts.

ELTON LONGMORE, Clerk of the County Council.

County Hall, Hertford, May, 1942.

Hertfordshire County Council.

SHRODELLS HOSPITAL, WATFORD.

Applications are invited from registered medical practitioners (Male and Female), including R practitioners who now hold A posts, for the appointment of HOUSE OFFICER (B2), now vacant. To R practitioners the appointment is limited to six months otherwise to 12 months. Applications from aliens temporarily registered or eligible for temporary registration in this country will be considered. The salary is at the rate of £200 a year, with full residential emoluments.

Forms of application, which can be obtained from the County Medical Officer, County Hall, Hertford, Herts, must be returned to him not later than 8th June, 1942.

ELTON LONGMORE, Clerk of the County Council.

County Hall, Hertford, May, 1942.

Kingston County Hospital.

(550 Beds Approximately.)

Applications are invited for the appointment of EAR, NOSE, AND THROAT SURGEON (Part-time) at the Kingston County Hospital for the duration of the war, at a salary of £300 per annum. The person appointed will be expected to spend about six hours per week at the Hospital, including attendance at a weekly Out-patient Clinic, routine operating, and emergency attendances when required.

Applications, stating age and experience, should be forwarded to the COUNTY MEDICAL OFFICER at the County Hall, Kingston-on-Thames, so as to reach him not later than Thursday, 21st May, 1942.

City Mental Hospital, Humberstone,

LEICESTER.

DEPUTY MEDICAL SUPERINTENDENT (Male), under forty. Applications for the post are invited. Salary £800 per annum, rising by £25 per annum to £850, together with an unfurnished house valued for superannuation purposes at £50 per annum. Candidates must have held a resident house appointment in a teaching hospital for at least six months, and be in possession of a Diploma in Psychological Medicine. The officer appointed will be required to assist at the Out-patient Clinics and to be responsible for the pathological work. The appointment is subject to the provisions of the Asylums Officers' Superannuation Act, 1909.

Applications, with full particulars of professional career, together with three references, one of which should be non-professional, should be sent to the MEDICAL SUPERINTENDENT before 2nd June, 1942.

County Borough of Preston.

SHAROE GREEN HOSPITAL. (250 Beds.)

ASSISTANT RESIDENT MEDICAL OFFICER (B1) (FEMALE).

Applications are invited from fully qualified and registered practitioners for the above appointment. Salary £350–£35–£450 per annum, plus war bonus, with full board and residence. Previous experience in midwifery is essential, the duties consisting mainly of obstetrical work (35 maternity beds).

Applications, stating age, qualifications, and experience, together with copies of three recent testimonials, should be sent to the Medical Superintendent, Sharoe Green Hospital, Fulwood, Preston.

The successful candidate will be required to contribute to the Council's superannuation scheme.

H. E. NUTTER, Town Clerk.

Essex County Council Hospital,

BROOMFIELD.

ASSISTANT PATHOLOGIST.

Applications are invited from persons who have had at least three years' experience in Pathology, particularly public health bacteriology, for an appointment as ASSISTANT PATHOLOGIST at the Essex County Council Hospital, Broomfield.

The salary is at the rate of £650 per annum, and the appointment is subject to the Council's Sick Pay Rules and Regulations. Further particulars regarding the appointment may be obtained upon application.

Applications, stating age, qualifications and previous experience, should be addressed to me and delivered at the County Hall, Chelmsford, not later than 9 A.M. on 1st June, 1942.

Canvassing whether directly or indirectly is forbidden.

JOHN E. LIGHTBURN, Clerk of the County Council.

County Hall, Chelmsford, 11th May, 1942.

Essex County Council.

ESSEX COUNTY COUNCIL HOSPITAL, BLACK NOTLEY, NEAR BRAINTREE.

JUNIOR RESIDENT MEDICAL OFFICER (B2)

Applications for the above appointment are invited from registered medical practitioners (Male or Female) including R practitioners holding A posts. The appointment will be for one year or in case of R practitioners for six months.

Salary £250 per annum with indoor emoluments valued at £160.

Applications, on forms to be obtained from the undersigned, to be delivered to County Hall, Chelmsford, not later than 9 A.M. on 6th June, 1942.

Canvassing whether directly or indirectly is forbidden.

JOHN E. LIGHTBURN, Clerk of the County Council.

County Hall, Chelmsford, 11th May, 1942.

Wrexham and East Denbighshire

WAR MEMORIAL HOSPITAL. (248 Beds.)

Applications are invited from registered medical practitioners (Male or Female), including R practitioners within three months of qualification, for the appointment of RESIDENT HOUSE SURGEON (A) for EAR, NOSE AND THROAT, OPHTHALMIC AND MEDICAL DEPARTMENTS to become vacant on June 4th, 1942. The appointment is for a period of six months. Salary £150 per annum, with full residential emoluments.

Applications, stating age, nationality, experience, and qualifications, with copies of three recent testimonials, to be sent immediately to— LESLIE SPENCER, Secretary.

City of Birmingham.

CITY INFECTIOUS DISEASES HOSPITAL, LITTLE BROMWICH. (750 Beds.)

Applications are invited from registered medical practitioners for a JUNIOR RESIDENT MEDICAL OFFICER (A) (Female) at the above Hospital for the treatment of cases of infectious disease. Salary at the rate of £300 per annum plus bonus with full residential emoluments.

Applications, stating age, experience and qualifications, with copies of recent testimonials, should be forwarded to MEDICAL OFFICER OF HEALTH, Council House, Congreve-street, Birmingham, 3, not later than 30th May, 1942.

City of Manchester.
PUBLIC HEALTH DEPARTMENT.

CRUMPSALL HOSPITAL (1400 Beds) AND WITHINGTON HOSPITAL (1150 Beds).

APPOINTMENTS OF TEMPORARY VISITING CONSULTANT RADIOLOGISTS (PART-TIME).

The Public Health Committee invites applications for the above appointments at the Crumpsall Hospital, Manchester, 8, and at the Withington Hospital, Manchester, 20. The appointments will be for the period of the war. They are part time and do not carry with them right of entry into the Corporation Superannuation Fund. The post at Crumpsall Hospital will become vacant on 1st June, 1942, but the post at Withington Hospital is vacant now. Remuneration for each appointment will be on a sessional fee basis of 2½ guineas per session. A session will be of two hours' duration.

The numbers of sessions required are as follows: Crumpsall Hospital, four weekly; Withington Hospital, six weekly.

Application may be made for either part or the whole of the sessions required at each Hospital, but for not less than two sessions weekly in any case. Full information as to the days and hours of the sessions may be obtained from the Medical Superintendents of the Hospitals concerned.

Applications, stating fully the age, qualifications, and experience of the candidate, the name of the hospital selected, and the number of weekly sessions which the candidate proposes to undertake, are to be addressed to the Medical Officer of Health, Public Health Department, P.O. Box 399, Town Hall, Manchester, 2, on or before 23rd May, 1942.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 7th May, 1942.

City and County of Newcastle upon TYNE.

MATERNITY HOSPITAL, GILSLAND. (120 Beds.)

Applications are invited from registered medical practitioners, Male or Female, including R practitioners who now hold A posts, for the appointment of HOUSE SURGEON (B2), to become vacant on 1st June. Applicants must have had at least six months' obstetric experience in a maternity hospital. The appointment is tenable for a period of six months, and the salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the MEDICAL OFFICER OF HEALTH, Health Department, Town Hall, Newcastle upon Tyne, 1, immediately, stating earliest date on which the appointment could be taken up.

City and County of Newcastle upon TYNE.

SHOTLEY BRIDGE HOSPITAL. (900 Beds.)

APPOINTMENT OF HOUSE PHYSICIANS (A) AND HOUSE SURGEONS (A).

Applications are invited from registered medical practitioners for the above appointments, including R practitioners within three months of qualification. The appointments will be tenable for a period of six months. Salary £150 per annum, together with the usual residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of two recent testimonials, should be forwarded immediately to the MEDICAL OFFICER OF HEALTH, Health Department, Town Hall, Newcastle upon Tyne, 1.

Owing to the fact that the permitted establishment of refugee practitioners at the Hospital is already complete, it is regretted that applications for above appointments from refugee practitioners cannot be considered.

Northampton General Hospital.
(405 Beds.)

Applications are invited from registered medical practitioners for the appointment of One HOUSE PHYSICIAN (A) and One RESIDENT ANÆSTHETIST (B2), from 1st June, 1942. R practitioners within three months of qualification may apply for the A post which will be for a period of six months, and those holding A posts may apply for the B2 post which will be limited to six months. Salary at the rate of £150 per annum for the A post and £200 per annum for the B2 post, with board, residence, and laundry.

Applications, stating age, qualifications with dates, nationality, and accompanied by copies of three recent testimonials, should be sent as soon as possible to—

GORDON S. STURTRIDGE, M.B., B.S., Superintendent.

7th May, 1942.

Royal Portsmouth Hospital,
PORTSMOUTH.

Applications are invited from registered medical practitioners, Male, for the appointment of a HOUSE SURGEON (B2), to become vacant shortly. R practitioners now holding A posts are invited to apply. Six months' appointment. Salary is at the rate of £200 per annum, with the usual residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent as soon as possible to—

B. WAGSTAFF, Secretary.

22

City of Manchester.

CRUMPSALL HOSPITAL (1400 Beds) AND WITHINGTON HOSPITAL (1150 Beds).

TEMPORARY APPOINTMENTS OF RESIDENT MEDICAL OFFICERS (B1) (MALE).

The Public Health Committee invites applications from registered medical Men for the above temporary appointments at the Crumpsall and Withington adult general hospitals in Manchester. Candidates should possess a higher qualification in medicine and have had previous experience in resident hospital appointments. Suitably qualified R practitioners holding B2 or B1 appointments and other medical practitioners not liable for military service are invited to apply for the vacancies. Each post carries a basic salary commencing at £450 per annum, rising by annual increments of £25 to a maximum of £500, with board, residence, and laundry in addition. A temporary cost-of-living wages award is payable in addition to the basic salaries, and the commencing cash remuneration is, therefore, £468 18s. 3d. The persons appointed may be required to act as temporary Deputy Medical Superintendent in which case the basic salaries would be advanced by £100 per annum. Each appointment is subject to the Manchester Corporation conditions of service.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box 399, Town Hall, Manchester, 2, and all applications must be received by him not later than 26th May, 1942.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 7th May, 1942.

City of Manchester.

CRUMPSALL HOSPITAL. (1400 Beds.)

TEMPORARY APPOINTMENT OF RESIDENT SURGICAL OFFICER (B1).

The Public Health Committee invites applications from registered medical Men for the above temporary appointment at the Crumpsall adult general hospital in Manchester. Suitably qualified R practitioners holding B2 or B1 appointments and other medical practitioners not liable for military service are invited to apply. Candidates must hold a higher qualification in surgery and must have had previous experience in resident hospital posts. The basic salary for the appointment commences at £450, rising by annual increments of £25 to a maximum of £500, together with full residential emoluments. A temporary cost-of-living wages award is payable in addition to the basic salary, and the commencing cash remuneration is, therefore, £468 18s. 3d. The appointment is subject to the Manchester Corporation conditions of service.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box 399, Town Hall, Manchester, 2, and all applications must be received by him not later than 26th May, 1942.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 7th May, 1942.

City of Manchester.

BOOTH HALL HOSPITAL. (760 Beds.)

APPOINTMENT OF RESIDENT ASSISTANT MEDICAL OFFICER (A).

Applications are invited from registered medical practitioners (Male or Female) for the above-mentioned appointment which will become vacant on 12th July, 1942, including R practitioners within three months of qualification when appointment will be for a period of six months; otherwise it will be for a period of twelve months. The basic salary for the appointment is £200 per annum, or to R practitioners £125 per annum, with board, residence, and laundry in addition. A temporary cost-of-living wages award is payable in addition to the foregoing salaries. The appointment is subject to the Manchester Corporation conditions of service.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box 399, Town Hall, Manchester, 2, and applications for the post must be received by him not later than 28th May, 1942.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 8th May, 1942.

The Chester Royal Infirmary.
(Normal Capacity 225 Beds.)

Applications are invited from registered medical practitioners (Male and Female) for the following appointments: (1) HOUSE SURGEON (A) to ORTHOPÆDIC DEPARTMENT from 1st July; (2) HOUSE PHYSICIAN (A) from 5th July; (3) GENERAL HOUSE SURGEON (A) from 1st July, including R practitioners within three months of qualification. The appointments are for six months. The first and third appointments are approved in connexion with the M.D. (Lond.) and the M.S. (Lond.) and the F.R.C.S. (Eng.) examinations respectively. Salaries are at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent not later than 30th May, 1942, to—

DR. W. H. GRACE, Honorary Secretary, Medical Committee.

County Borough of Walsall.

Applications are invited for the post of ASSISTANT MEDICAL OFFICER OF HEALTH for Maternity and Child Welfare at a salary of £600 per annum.

Applicants must be registered medical practitioners, Male or Female, with experience in antenatal work, midwifery, and children's diseases, and preference will be given to one possessing the Diploma in Public Health. If the successful applicant is appointed on a permanent basis he/she will be granted increments of £25 per annum to a maximum of £700 per annum.

Statement of duties, terms and conditions of appointment, and form of application may be obtained from the undersigned.

Applications should be sent to me not later than 30th May, 1942, envelopes to be endorsed "Application re Assistant Medical Officer of Health."

W. STALEY BROOKES, Town Clerk.

Council House, 8th May, 1942.

University of Durham.

KING'S COLLEGE, NEWCASTLE ON TYNE.

Applications are invited from registered medical practitioners of either sex for the post of either DEMONSTRATOR or JUNIOR LECTURER in the DEPARTMENT OF PATHOLOGY of the Medical School, King's College, and the Royal Victoria Infirmary, Newcastle on Tyne. Salary £300 to £500. Status of the post and salary according to previous experience. The appointment will date from 1st July, 1942, or other such near date as may be arranged.

Applications (three copies), accompanied by the names of not more than three referees, should be forwarded on or before Friday, 29th May, 1942, to the PROFESSOR OF PATHOLOGY, Medical School, King's College, Newcastle on Tyne, 2, from whom further particulars may be obtained.

Manchester Royal Infirmary.

Applications are invited from registered medical practitioners, Male, for the appointment of RESIDENT SURGICAL OFFICER (B1), shortly to become vacant. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £200 per annum, with residence.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be forwarded not later than 1st June, 1942, to the undersigned.

By Order,
F. J. CABLE, General Superintendent and Secretary.

Royal Surrey County Hospital,

GUILDFORD.

Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (B2) (General Surgery and E.N.T.), to become vacant on the 30th June, 1942, including R practitioners who now hold A posts. The appointment is for six months and is recognised for the F.R.C.S. examination. Salary £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of not more than three recent testimonials, should be sent to the SECRETARY-SUPERINTENDENT not later than 30th May.

The Royal Cripples Hospital,

BIRMINGHAM.

(338 Beds for Acute Cases, including a proportion of Patients Suffering from Tubercular Bone Disease, and Large Out-patient Department.)

Applications, which should be addressed to the SECRETARY, 80, Broad-street, Birmingham, 15, are invited from registered medical practitioners, including suitably qualified R practitioners holding A posts when appointment will be limited to six months, for the appointment of RESIDENT HOUSE SURGEON (B2), vacant immediately. Resident salary £200 per annum.

Corporation of Dundee.

PUBLIC HEALTH DEPARTMENT, DUNDEE MENTAL HOSPITAL.

Applications are invited from registered medical practitioners, Male or Female, for the appointment of a JUNIOR ASSISTANT MEDICAL OFFICER (A), to become vacant on 22nd May, 1942. R practitioners within three months of qualification may apply when appointment will be for a period of six months. Salary at the rate of £300 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications with dates, and accompanied by copies of three recent testimonials, should be sent to the undersigned.

R practitioners who have been qualified for more than three months must have obtained the sanction of the Scottish Central Medical War Committee to their application.

A. ALLAN BELL, Medical Superintendent.

County Borough of Newport.

Applications are invited for the post of TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH (Male), at a commencing salary of £500 per annum.

Candidates must be registered medical practitioners, and preference will be given to the possessor of a Diploma in Public Health or an equivalent qualification.

The person to be appointed will have to take charge of the Infectious Diseases Hospital, and must have had experience in public health work, including maternity and child welfare and school medical, and in air-raid precaution work.

The successful candidate will be required to devote the whole of his time to the duties of the office and to perform such work as may be entrusted to him by the Medical Officer of Health. He will be required to pay in to the Council's Superannuation Fund, but his contributions will be refunded to him at the termination of his appointment.

Applications, to be made on forms obtainable at this office, and accompanied by copies of three recent testimonials, must reach the MEDICAL OFFICER OF HEALTH, Royal Chambers, High-street, Newport, Mon, not later than Saturday, 23rd May, 1942.

Hull Corporation Health Department.

BEVERLEY ROAD HOSPITAL.

TEMPORARY RESIDENT ASSISTANT MEDICAL OFFICER (B1).

Applications are invited for the above temporary appointment from single registered medical practitioners of either sex. Salary £350 per annum, rising by annual increments of £25 to £450 per annum, together with board, residence and laundry, &c. R practitioners holding B2 or B1 appointments are invited to apply. Work mainly medical.

Forms of application, &c., may be obtained from, and returned duly completed to, the MEDICAL OFFICER OF HEALTH, Guildhall, Hull, not later than 10 A.M. on Monday, 1st June, 1942.

Royal Berkshire Hospital, Reading.

The Board of Management invites applications for the post of SURGICAL REGISTRAR.

Candidates must be Fellows of one of the Royal Colleges of Surgeons of the British Empire, or Surgical Graduates of one of the Universities of the British Empire and their names entered on the Medical Register.

The appointment is temporary and is terminable within twelve months of the conclusion of hostilities.

The elected candidate will be appointed for a period ending on the first Tuesday in April, 1943, and will be eligible for re-election.

Canvassing on the part of a candidate or on his behalf will disqualify him.

Applications, with copies of not more than four testimonials, must reach the Secretary not later than 9 A.M. on Friday, 29th May, 1942.

The election will take place on Tuesday, 2nd June, 1942.

H. E. RYAN, Secretary and House Governor.

16th May, 1942.

Waltham Joint Hospital Board,

ISOLATION HOSPITAL, Honey-lane, WALTHAM ABBEY, ESSEX.

Applications are invited for the temporary appointment of RESIDENT MEDICAL OFFICER (Man or Woman), not eligible for military service, to act during the absence on service of the Medical Superintendent. Experience in infectious diseases or possessing D.P.H. desirable. Salary £500, with quarters.

Applications should be made before the 23rd May to the Medical Superintendent at the above address, from whom further particulars may be obtained.

5th May, 1942. J. D. BELL, Acting Clerk to the Board.

East Suffolk and Ipswich Hospital.

(400 Beds—8 Residents.)

Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN (B2). Vacant 1st June, 1942. Open to R practitioners who now hold A posts. The appointment will be for six months. Salary at the rate of £144 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, to be sent to: ARTHUR GRIFFITHS, Secretary.

The Hospital, Ipswich, 16th May, 1942.

Bootle General Hospital,

Linacre-lane, BOOTLE, LIVERPOOL, 20.

(123 Beds.)

GENERAL HOUSE SURGEON.

Applications are invited from registered medical practitioners, Male and Female, for the above A appointment, commencing 1st June, 1942. R practitioners within three months of qualification may apply when appointment will be for a period of six months. Salary at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with details, and nationality, and accompanied by copies of three recent testimonials, should be sent immediately to—

A. J. COOPER, Superintendent.

Surrey County Council.

PUBLIC HEALTH DEPARTMENT.

ST. HELIER COUNTY HOSPITAL. (862 Beds.)

Applications are invited for the undermentioned appointments to the OBSTETRIC AND GYNÆCOLOGICAL DEPARTMENT at the Hospital (102 Beds):—

1. RESIDENT OBSTETRICIAN AND GYNÆCOLOGIST.—Candidates should have had wide and varied obstetrical experience. The war-time salary is £800 per annum, plus full residential emoluments valued at £125. The person appointed will be in clinical charge of approximately two-thirds of the beds in the unit, subject to the administrative supervision of the Medical Superintendent, and will be available for consultation as required in the remaining part of the unit.

2. Part-time OBSTETRICIAN AND GYNÆCOLOGIST, at a salary of £900 per annum. The officer appointed must be a consultant of high standing. He will be required to devote about 18 hours per week to work in the Hospital, to be in direct clinical charge of approximately one-third of the beds in the unit, subject to the administrative supervision of the Medical Superintendent, and to be available for consultation as required in the remaining part of the unit.

3. RESIDENT ASSISTANT OBSTETRICIAN.—Salary £550 per annum, plus residential emoluments valued at £125 per annum.

The two resident (B1) appointments above mentioned will be for the duration of the war, after which permanent appointments will be made. R practitioners holding B1 or B2 appointments may apply. The appointment of part-time Obstetrician and Gynæcologist will be renewable annually.

Applications, stating age and experience, and enclosing copies of testimonials, should be sent to the County Medical Officer, County Hall, Kingston-upon-Thames, by the 20th May, 1942.

DUDLEY AUKLAND, Clerk of the Council.

Cambridgeshire County Council.

TEMPORARY TUBERCULOSIS OFFICER.

Applications are invited for the above temporary appointment, the duration of which will be approximately six months.

Applicants should have had experience in the diagnosis and control of tuberculosis, with special reference to radiological diagnosis. Experience in the treatment of pulmonary tuberculosis by means of artificial pneumothorax is desirable, though not essential.

The salary offered is at the rate of £750–£950 per annum, according to qualifications and experience, and the appointment will be terminable by the giving of one month's notice on either side.

Applications, giving at least one recent reference, should be sent at the earliest possible date to—

ASHLEY TABRUM, Clerk of the County Council.

Shire Hall, Castle Hill, Cambridge, 28th April, 1942.

Rochdale Infirmary, Lancs.

(110 Beds.)

The Board of Management invites applications for the appointment of HOUSE SURGEON (A), appointment now vacant, including R practitioners within three months of qualification, when appointment will be for a period of six months. Salary attached to the appointment is at the rate of £150 per annum, including board, residence, and laundry.

Applications, stating age, nationality, &c., together with copies of three recent testimonials, to be sent to the Secretary.

The successful candidate must be a member of a medical defence society.

W. WYNNE, Secretary.

Infirmary Office, Rochdale.

Birmingham United Hospital.

THE GENERAL HOSPITAL.
THE QUEEN ELIZABETH HOSPITAL.
(Also incorporating THE QUEEN'S HOSPITAL 1840–1941.)

Applications are invited for the post of Whole-time REGISTRAR (non-resident) (B1) to the EAR, NOSE, AND THROAT DEPARTMENTS. Candidates must be registered medical practitioners, and preference will be given to those possessing the qualification of F.R.C.S. Eng. or Edin., and with ear, nose, and throat experience. The appointment is an annual one, the holder being eligible for re-election. Salary at the rate of £350 per annum. Suitably qualified R practitioners holding B2 or B1 posts may apply.

Applications should be sent to the undersigned (from whom all further particulars can be obtained), stating age, experience, and qualifications, with copies of recent testimonials, not later than 30th May.

G. HURFORD, Secretary, Birmingham United Hospital.

The Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, 27th April, 1942.

Royal West Sussex Hospital,

CHICHESTER. (334 Beds.)

Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B2), vacant on 1st June next. The appointment is for six months. R practitioners holding A posts may apply. Salary £225 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, together with three recent testimonials, should be sent by 18th May, 1942, to—

K. H. WILLIAMS, House Governor and Secretary.

29th April, 1942.

City of Nottingham.

NEWSTEAD SANATORIUM.

Applications are invited from registered medical practitioners for the appointment of ASSISTANT MEDICAL OFFICER (B1) at the above. The Sanatorium is at present nearing completion and will have 180 Beds for the treatment of pulmonary tuberculosis. Applicants should have held house appointments, and previous experience of tuberculosis work will be regarded as an additional qualification. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary £350 per annum, rising by £25 to £450 per annum (plus war bonus), together with board, lodging, &c. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Application forms, to be obtained from my office, should be returned to me not later than the 25th May, 1942.

J. E. RICHARDS, Town Clerk.

The Guildhall, Nottingham, April, 1942.

Huddersfield Royal Infirmary.

(321 Beds.)

Male CASUALTY OFFICER (B2) required to commence duty as soon as possible. R practitioners who now hold A posts are invited to apply. Salary £200 per annum, with board, residence, and laundry. Appointment for six months, subject to renewal for a similar period. To R practitioners the appointment will be limited to six months. The Hospital is officially recognised for the surgical practice required of non-members before admission to the Final Fellowship Examination of the Royal College of Surgeons of England.

Applications, with copies of three recent testimonials, to be addressed immediately to—

H. J. JOHNSON, General Superintendent and Secretary.

The Liverpool Eye, Ear and Throat

INFIRMARY, Myrtle-street, LIVERPOOL, 7.

Applications are invited from registered medical practitioners (Male or Female) for appointment of OPHTHALMIC HOUSE SURGEON (B2), including R practitioners who now hold A posts, when the appointment would be limited to six months. Salary at rate of £120 per annum, with full residential emoluments.

Applications, stating age, experience, qualifications with dates, nationality, and present post, and accompanied by copies of three testimonials, should be sent to the undersigned immediately.

GEORGE NICKSON, Secretary.

Llanelly and District General

HOSPITAL. (148 Beds plus 100 Beds, ANNEXE.)

Applications are invited from registered medical practitioners, Male or Female, for the appointment of SENIOR HOUSE-SURGEON AND ANÆSTHETIST (B2) including R practitioners who now hold A posts.

To R practitioners the appointment will be limited to six months. Salary according to experience and qualifications, with minimum of £200 per annum.

Applications, stating age, qualifications with dates, nationality, and present post, accompanied by copies of three recent testimonials, should be sent immediately to—

T. E. PIPE, Secretary.

Hampshire County Council.

THE COUNTY COUNCIL HOSPITAL,
ST. PAUL'S HILL, WINCHESTER.

RESIDENT HOUSE OFFICER (B2) required at this Hospital (180 Beds). Salary £350 per annum. R practitioners holding A posts may apply when appointment will be limited to six months; otherwise will not exceed twelve.

Applications, stating age, qualifications with dates, and nationality, with three copies of testimonials, to be sent to—

H. LESLIE CRONK, County Medical Officer.

The Castle, Winchester.

Hull Royal Infirmary.

Applications are invited from registered medical practitioners for the post of CASUALTY OFFICER (A), vacant now. R practitioners within three months of qualification may apply, when appointment will be limited to six months. Salary at the rate of £175 (plus £25 war bonus) per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of recent testimonials, should be sent to: R. J. CARLESS, House Governor.

Victoria Hospital, Burnley.

(169 Beds.)

Applications are invited from registered medical practitioners (Male or Female) for the appointment of a HOUSE PHYSICIAN (A), to become vacant immediately. R practitioners within three months of qualification may apply, when appointment will be for a period of six months. Salary at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent immediately to—

J. W. WHEATCROFT, Secretary.

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Editorial Office Address, 26, Temple Street, Aylesbury, Bucks (Aylesbury 315).
Printed by HAZELL, WATSON & VINEY, LTD., London and Aylesbury—Saturday, May 16, 1942.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

Kingsway Hospital, Derby.

(BOROUGH MENTAL HOSPITAL.)

TEMPORARY ASSISTANT MEDICAL OFFICER (B1).

Applications are invited for the above post from registered medical practitioners (Male or Female). Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply, and consideration may be given to candidates who only wish to hold the post for the summer months. Salary £350–£450 by four £25 increases, all found, with an additional £50 per annum for D.P.M.

Applications, stating age, nationality, qualifications, and experience, accompanied by copies of three recent testimonials, to be forwarded to the MEDICAL SUPERINTENDENT.

Nottingham General Hospital.

(535 Beds.)

Applications are invited from registered medical practitioners (Male or Female) for the appointment of HOUSE SURGEON (B2), including R practitioners who now hold A posts. The appointment is for six months. Duties to commence as soon as possible. Salary at the rate of £200 per annum.

Applications, stating age, qualifications with dates, nationality, and accompanied by testimonials should be sent to—

HENRY M. STANLEY, House Governor and Secretary.

University of Oxford.

NUFFIELD DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY.

A war-time vacancy occurs on 1st August for the post of Full-time ASSISTANT in the above department (non-resident). Applications are invited from medical Women over thirty years of age who are members of the R.C.O.G., or who are in a position to take the necessary examination without delay. Salary £400 per annum.

Applications, addressed to the SECRETARY of the department, Radcliffe Infirmary, Oxford, should be received before 23rd May.

University College, Dundee.

(UNIVERSITY OF ST. ANDREWS.)

Applications are invited for the post of TEMPORARY LECTURER IN ANATOMY commencing 1st October, 1942. Salary £400 per annum. Applicants, Female (or Male unfit for military service), must have a medical qualification and recent student experience.

Applications, together with copies of not more than three testimonials, must be lodged not later than 23rd May.

In place of testimonials the names of three referees may be given. PATRICK CUMMING, Secretary.

University College, Dundee.

The Southampton Children's Hospital

AND DISPENSARY FOR WOMEN.

Applications are invited from registered medical practitioners, Men or Women, for the appointment of a RESIDENT MEDICAL OFFICER (A), now vacant. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by three recent testimonials, should be sent immediately to: ELLA K. MATTHEWS, Secretary.

District Infirmary, Ashton-under-Lyne.

(200 Beds, mainly Surgical.)

Applications are invited from registered medical practitioners for the appointment of RESIDENT CASUALTY OFFICER (B2), to become vacant on 1st June. R practitioners holding A posts may apply when appointment will be limited to six months. The salary is at the rate of £180 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent immediately to—

FRANK OLIVER, General Superintendent and Secretary.

County Borough of Blackpool.

Applications are invited for a TEMPORARY RESIDENT MATERNITY AND CHILD WELFARE MEDICAL OFFICER (Female) with practical obstetrical experience, at Maternity Hospital established under H.M. Government's Evacuation Scheme. The salary will be at the rate of £450 per annum, plus the usual emoluments, and the appointment will be determinable by one month's notice on either side.

This advertisement does not relate to a woman between twenty and thirty-one, unless she has a Ministry of Labour permit to allow her to obtain employment by individual effort. Intended applicants between these ages should apply to their Local Employment Exchange for the necessary permit.

Applications, stating age, qualifications, and experience, should be addressed immediately to the Medical Officer of Health, Municipal Health Centre, Whitegate-drive, Blackpool.

TREVOR T. JONES, Town Clerk.

Royal Halifax Infirmary.

Applications are invited from registered medical practitioners (Male) for six months from 1st June, 1942, for CASUALTY OFFICER (A). Salary £150 per annum. R practitioners within three months of qualification may apply.

9th May, 1942. A. MIDGLEY, Secretary.

Brighton County Borough Mental

HOSPITAL, HAYWARDS HEATH, SUSSEX.

TEMPORARY ASSISTANT MEDICAL OFFICER (B1 post), Male or Female. Salary £525, rising to £625 per annum with emoluments (apartments, board, laundry) valued at £100 per annum. Previous general psychiatric experience essential, and experience of child psychiatry desirable. Suitably qualified R practitioners holding B2 or B1 posts may apply.

Applications, accompanied by names of three persons to whom reference may be made, should be sent to the MEDICAL SUPERINTENDENT not later than the 30th May, 1942.

Cameron Hospital, West Hartlepool.

(86 Beds.)

Applications are invited from registered medical practitioners (Male or Female) for the appointment of a HOUSE SURGEON (A), to become vacant on 14th June, 1942. R practitioners within three months of qualification may apply when appointment will be for a period of six months. Commencing salary £150, increasing to £200 per annum, with full residential emoluments.

Applications, stating age, qualifications, nationality, and experience, together with copies of three recent testimonials, should be sent as soon as possible to: C. S. KAY, Secretary.

Sudan Medical Service.

Applications are invited for VACANCIES still existing in the Sudan Medical Service. Candidates must be men under thirty years of age and unmarried. Preference will be given to those who have held B appointments; some surgical experience since qualification is essential. Many members of the Service hold temporary commissions—e.g., when attached to the Sudan Defence Force or seconded for other war-time duties. Pay commences at £E720 per annum (the equivalent of £738 sterling).

DR. SQUIRES, from whom application forms and further particulars may be obtained, would be glad to interview intending candidates as soon as possible at 93, Harley-street, W.1; Telephone No. WELbeck 3423.

Large Works in Lancashire invites

applications for Full-time WORKS MEDICAL OFFICER (Male). The essential qualifications are: Applicants must be registered medical practitioners, above the current registration age under the National Service (Armed Forces) Act or ineligible for service in H.M. Forces, but not over fifty-five. Salary governed by qualifications and experience, but not less than £800 per annum.

Applications, giving age, qualifications, and full particulars of experience, to be made to: Address, No. 875, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Chief Medical Officer required by

industrial company with branches throughout the country. Salary £800 per annum. Applicant will be required to live in the West Country.—Write, giving full details, including industrial experience: Address, No. 869, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Experienced General Practitioner (Male),

forty-eight, requires Part-time Work in Central London, Surgeries, &c. Would take over full charge for duration.—Address, No. 874, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Assistant for Medical Booksellers.

Interesting post and good prospects.—Address, No. 872, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wife of Czech Doctor, 25,

here three years, excellent English, seeks position of trust and responsibility, e.g. Secretary-Receptionist, London.—Address, No. 876, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Small Electro-Therapy Practice for

Sale, 30 Miles London. Premium £300.—Address, No. 877, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wanted, 1939 Saloon, as new. State

mileage, price. Also good 7-seater.—Address, No. 873, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

RADIUM: You can hire up to

100 mgms. of radium element made up to any required specification, for the moderate fee of £5 5s., from—

J. C. GILBERT LTD., Columbia House, Aldwych, W.C.2.

Tel.: Chancery 6060.

Harley Street and District.—A number

of excellent CONSULTING ROOMS are available for full and part-time use at moderate rents. Particulars on application.—ELGOOD & Co., 1, Bentinck Street, Welbeck Street, W.1. Welbeck 8974.

Dermatophytosis

THE general experience of dermatologists that infections such as "athlete's foot," "swimmer's itch," etc., due to *Epidermophyton rubrum* and *Trichophyton interdigitale,* are difficult to cure prompted an investigation by the section of the Parke, Davis & Co. Laboratories devoted to the study of mycology into the fungicidal and fungiostatic properties of numerous drugs. The practical outcome of this investigation was the introduction of MYCOZOL OINTMENT, which contains salicylic acid, mercury salicylate, and Chloretone, and produces rapid maceration and separation of the horny layers of the epidermis, thus exposing the fungus to its inhibitive fungicidal action.

LIQUID MYCOZOL, which contains salicylic acid, benzoic acid, malachite green, and Chloretone in a liquid base, may be used as an alternative to the ointment. When applied to the skin it dries rapidly, forming a tenacious film containing the keratolytic and fungicidal ingredients.

MYCOZOL DUSTING POWDER, containing the same ingredients as the ointment, is suitable for the moist type of lesion, such as those occurring in the interdigital spaces of the toes.

Mycozol Ointment is issued in tubes and 1 lb. tins, Liquid Mycozol in 50 c.c. bottles, and Mycozol Dusting Powder in tins.

FURTHER DETAILS WILL BE FURNISHED ON REQUEST

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